BANGALORE WATER SUPPLY
AND SEWERAGE BOARD
CAUVERY BHAVAN, KEMPEGOWDA ROAD
BANGALORE - 560 009

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Through Karnataka Public Procurement Portal

KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP)

TENDER FOR THE WORK OF

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANTS WITH TERTIARY TREATMENT FACILITY, SOLAR PANELS ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS [WORKS - A]

AND

PROCUREMENT AND CONSTRUCTION OF RISING MAIN, MAIN SEWERS AND LATERALS INCLUDING MACHINE HOLES AND LIFT SEWAGE PUMPING STATIONS [WORKS – B]

HYBRID MODE FOR MAHADEVAPURA ZONE IN 110 VILLAGE AREAS (Phase II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) – (Contract Package No. BWSSB CE-P/KWSDRP/WBS-V)

VOLUME 4 of 4

(DRAWINGS)

APRIL – 2025

Office of the *Chief Engineer (Project)*
BANGALORE WATER SUPPLY & SEWERAGE BOARD
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Bangalore -560 009
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VOLUME-4

WBS-5

DRAWINGS

List of Drawings of WBS-5		
Sl. No.	**Drawing No:**	**List of drawings**
1	TN-KWSDRP-WBS5-CV-3000	Proposed Waste Water Treatment Plants (WwTPs)
2	TN-KWSDRP-WBS5-CV-3014	Topographical Survey Layout for Proposed WwTP 20MLD Channasandra Bangalore
3	TN-KWSDRP-WBS5-CV-3026	RCC Precast Sewer Machine hole details - 1200 mm dia. (Typical) for depth upto 3.0 M
4	TN-KWSDRP-WBS5-CV-3027	RCC Precast Sewer Machine hole details - 1500 mm dia. (Typical) for depth upto 3.0 M
5	TN-KWSDRP-WBS5-CV-3028	RCC Precast Sewer Machine hole details - 1500 mm dia. (Typical) for depth upto 7.0 M
6	TN-KWSDRP-WBS5-CV-3029	RCC Precast Sewer Machine hole details - 1800 mm dia. (Typical) for depth upto 3.0 M
7	TN-KWSDRP-WBS5-CV-3030	RCC Precast Sewer Machine hole details - 1800 mm dia. (Typical) for depth upto 6.0 M
8	TN-KWSDRP-WBS5-CV-3031	RCC Precast Sewer Machine hole details - 1800 mm dia. (Typical) for depth up to 8.0 M
9	TN-KWSDRP-WBS5-CV-3032	RCC Precast Sewer Machine hole details - 1800 mm dia. (Typical) for depth up to 10.0 M
10	TN-KWSDRP-WBS5-CV-3033	Standard Details of RCC Cast In-situ Machine hole - 1200mm, 1500mm and 1800 mm dia. Up to 3.0 m and 1500 mm , 1800 mm dia. Up to 6m depth (Typical)
11	TN-KWSDRP-WBS5-CV-3034	RCC Cast In-situ machinehole - 1200mm, 1500mm and 1800 mm dia. Up to 3.0 M to 6 M depth (Typical)
12	TN-KWSDRP-WBS5-CV-3035	RCC Precast Sewer Machine hole details for 1200, 1500 & 1800 mm dia. (Vertical wall)
13	TN-KWSDRP-WBS5-CV-3036	Standard Details of RCC Cast In-situ Machine hole 1200 mm, 1500mm, 1800mm Dia. Upto 3 M depth. 1500mm, 1800mm upto 6 M depth (Typical) with Ventilation Shaft
14	TN-KWSDRP-WBS5-CV-3037	Plan & Section of Brick Masonary Machine hole for 1.2m dia., 2 M & 6 M Depth
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16	TN-KWSDRP-WBS5-CV-3039	Typical Drawing of Pipe Bedding/Encasing
17	TN-KWSDRP-WBS5-CV-3040	Typical Cross Sections for Restoration of Ashpalt & Concrete Roads
18	TN-KWSDRP-WBS5-CV-3058	20MLD WWTP at Channasandra Process Flow Diagram
19	TN-KWSDRP-WBS5-EL-4001	Electrical Single Line Diagram (SLD) for Electrical works at Waste Water Treatment Plant (WWTP) with solar PV Power Generation and with Reuse
20	TN-KWSDRP-WBS5-EL-4003	Electrical Single Line Diagram (SLD) for Electrical works at Lift Pumping Station (Typical)
21	TN-KWSDRP-WBS5-IC-5009	SCADA Control system Architecture Drawing for WwTP at Channasandra
22	TN-KWSDRP-WBS5-ME-6000	Typical Mechanical GA Drawing for Lift Pumping Station

TITLE: PROPOSED WASTE WATER TREATMENT PLANTS (WWTPS)

DWG NO: TN-KWSDRP-WBS5-CV-3000

NORTH

CORE AREA

YELAHANKA CMC
BYTRAYANAPURA CMC
DASARAHALLI CMC
KENGERI TMC
R.R NAGAR CMC
BOMMANAHALLI CMC
K.R PURAM CMC
MAHADEVPURA CMC

HEBBAL VALLEY
HEBBAL MINOR VALLEY
VRISHBHAVATHY VALLEY
CHALLAGATTA VALLEY
ARKAVATHI VALLEY
KATHRIGUPPE VALLEY
TAVARAKERE VALLEY

Channasandar 20MLD Proposed WwTP

HAROHALLI, GOVINDAPURA, YASUDEVPURA, ANANTHAPURA, MANCHANAHALLI, KENCHANAHALLI, KATTIGENAHALLI, DODDABETTAHALLI, CHIKKABETTAHALLI, BELLAHALLI, THIRUMANAHALLI, CHOKKANAHALLI, ABBIGERE, CHIKKALASANDRA, MYADARAHALLI, SIDDENEHALLI, SHETTYHALLI, N.NAGENAHALLI, KOTHANUR, KOTHANUR AGRAHARA, RACHENAHALLI, DASARAHALLI, BYRATHI, KYLASANAHALLI, BILISHIVALLI, KEDDALAHALLI, S. CHANNASANDRA, KORAMAVU AGRAHARA, KALKERE, VARANASI, CHALLAKERE, KORAMAVU, DODDABIDARAKALLU, KARIVOBANAHALLI, HANDRAHALLI, LINGADENAHALLI, HOSAHALLI, HEROHALLI, GIDAKONDANAHALLI, ULLALA, SONNANAHALLI, BELATHUR & KUMBENA AGRAHARA, KADUGODI PLANTATION, CHANNASANDRA, NAGONDANAHALLI, NAGADUR, KANEKANDYA, SORAHUNISE, SIDDAPURA, RAMAGONDANAHALLI, TUBARAHALLI, VEERANDIGARAKERE, BALAGERE, VARTHUR, PANATHUR, GUNJUR, KARYAMMANA AGRAHARA, DEVARA BEESANAHALLI, BELLANDUR, BHOGANAHALLI, AMBILIPURA, DODDA KANNALLI, KASAVANAHALLI, CHIKKA BELLANDUR, SUNNASANDRA, HARALURU, KUDLU, PARAPPANAEAGRAHARA, NAGANATHAPURA, BHARTHENA AGRAHARA, CHIKKATHOGURU, BASAPURA, DODDATHOGUR(PART), BEGUR, CHANDRAPPANAPURA, YELLANAHALLI, KALENA AGRAHARA, GOTTIGERE, KAMMANAHALLI, KEMBETHAHALLI, PILLAGANAHALLI, BASAVANAPURA, ANJANAPURA, GOLAHALLI, ALAHALLI, VAJRA HALLI, THIPPASANDRA, HULIGHATTAPURA, MANAVARTHIKAVU, LINGADEENAHALLI, HOSAHALLI, SOMAPURA, HEMIGEPURA, HEMIGEPURA (P), VARAHASANDRA, TURAHALLI, GUBBULU, RAGHUVANA HALLI, DODDAKALLASANDRA, VASANTHPUR, GANAKAL, SUBRAMANYAPURA, UTTARAHALLI, VADDARAPALYA, AREHALLI, SIDDENEHALLI, SHETTYHALLI, CHIKKALASANDRA, MYADARAHALLI, ABBIGERE, CHIKKABETTAHALLI, DODDABETTAHALLI, THIRUMANAHALLI, BELLAHALLI, KATTIGENAHALLI, KENCHANAHALLI, MANCHANAHALLI, YASUDEVPURA, GOVINDAPURA, HAROHALLI, ANANTHAPURA

From Byrathi WTP to BANGALORE

PEENYA SECOND STAGE

TUMKUR ROAD

OUTER RING ROAD

SARJAPUR ROAD

LEGEND:-

- 110 VILLAGES
- CMC AREA
- TMC AREA
- CORE AREA
- MAJOR ROAD
- VILLAGE BOUNDARY
- RAILWAY TRACK

PROPOSED STPs LOCATIONS UNDER WORLD BANK SCHEME

- PROPOSED WwTP

ISSUE	DATE	DESCRIPTION	BY	CHECKED	APPD.
P0	02/04/2025	FOR TENDER PURPOSE	SGS	MKV	

FOR TENDER PURPOSE ONLY

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY, SOLAR PANELS ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS [WORKS - A] AND PROCUREMENT AND CONSTRUCTION OF RISING MAIN, MAIN SEWERS AND LATERALS INCLUDING MACHINE HOLES AND LIFT SEWAGE PUMPING STATIONS [WORKS - B] HYBRID MODE FOR MAHADEVAPURA ZONES IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-PIKWSDRP/WBS-5)

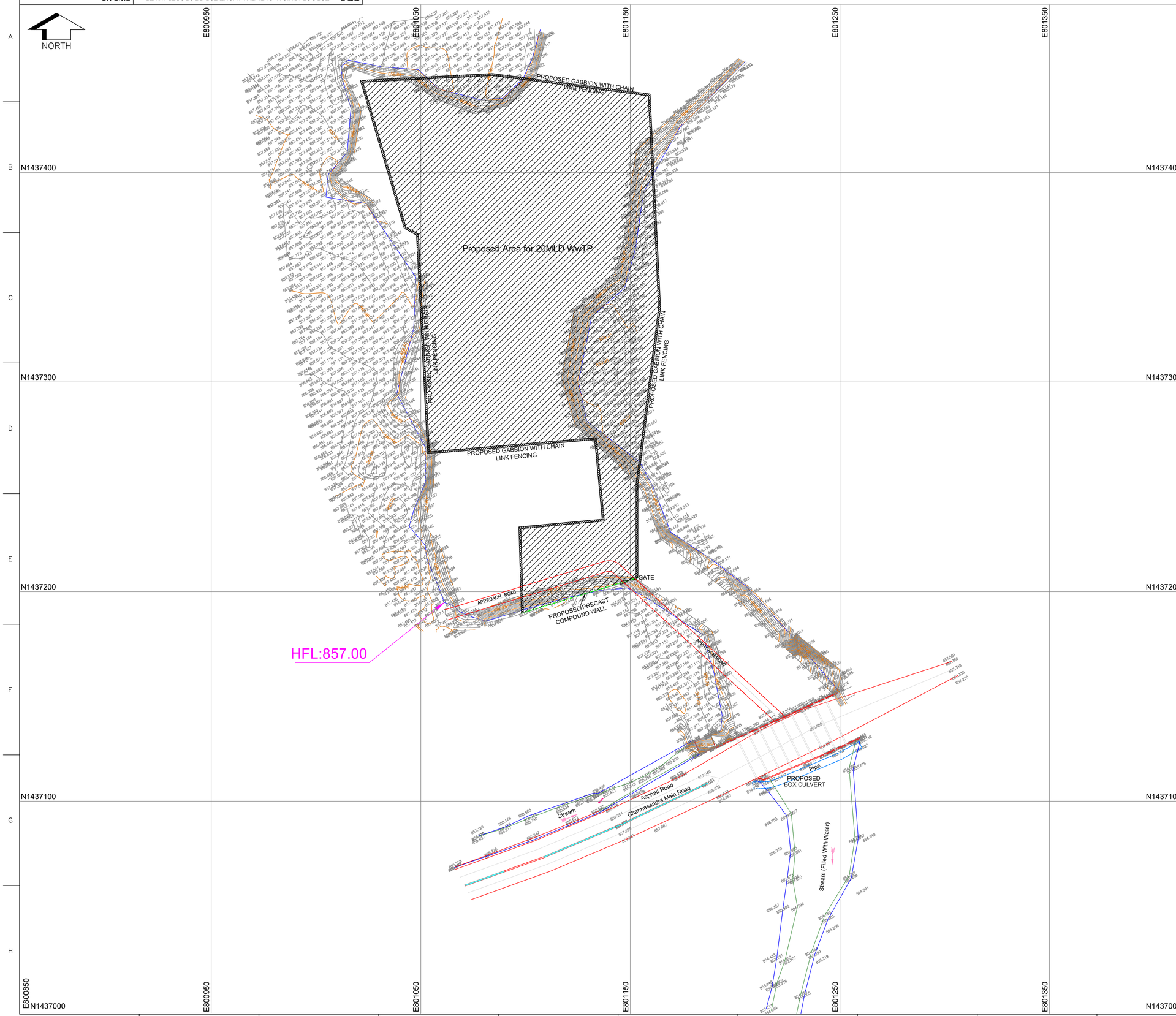
TITLE: Proposed Waste Water Treatment Plants (WwTPs)

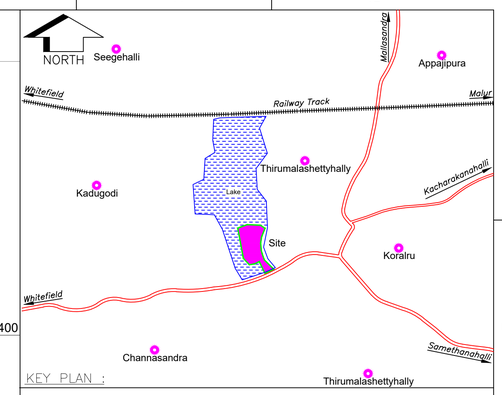
PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

DESIGNED: MKV	APPROVED	DATE: (TO ISSUE) 02/04/2025
DRAWN: SGS		DATE:(CURRENT ISSUE) 02/04/2025
CHECKED: BMS		DIVISION: CV
SCALE: NTS	DWG. NO. TN-KWSDRP-WBS5-CV-3000	ISSUE: P0
FILE NAME: TN-KWSDRP-WBS5-CV-3000.dwg		A1 SIZE

TITLE: TOPOGRAPHICAL SURVEY LAYOUT FOR PROPOSED WWTP
20MLD AT CHANNASANDRA BANGALORE

DWG NO: TN-KWSDRP-WBS5-CV-3014





KEY PLAN :

NOTES:

1. ALL LEVELS ARE IN METERS,UNLESS OTHER WISE MENTIONED.
2. ALL LEVELS ARE CARRIED FROM GTS BM (RL 903.20 M) LOCATED IN TRINITY CHURCH AT TRINITY CIRCLE.

LEGEND

DESCRIPTION	TYPE
ASPHALT ROAD	
COVERED DRAIN	
OPEN/LINED DRAIN	
COMPOUND WALL	
FENCE	
CHAMBER	CH
TELEPHONE POLE	
ELECTRIC BOX	E
POWER LINE & POLE	
TRANSFORMER	
TREES & TREE GIRTH	61.1m
BUILDING	
PRECAST COMPOUND WALL	
PROPOSED CHAIN LINK FENCING WITH GABBION	
CONTOUR WITH CONT RL	
SPOT LEVELS	881.437
DRAIN CENTER/INVERT LEVELS	883.577
TRAVERSE POINTS	B1
BENCH MARKS	RBM1

AREA STATEMENT

Area in Sqmt	Area in Acre
22590.42	5.58

CONTRACTOR SHALL PROPOSE THE COMPLETE WWTP UNITS INCLUDING TSPS WITHIN THE AREA SHOWN IN HATCHED PORTION ACCORDINGLY MAXIMUM AREA AVAILABILITY IS ONLY 5.58 ACRES

PROPOSED AREA FOR WWTP

ISSUE	DATE	DESCRIPTION	BY	CHECKED	APPD.
P0	02/04/2025	FOR TENDER PURPOSE	MKV		

FOR TENDER PURPOSE ONLY

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TITLE:
TOPOGRAPHICAL SURVEY LAYOUT FOR PROPOSED WwTP
20MLD AT CHANNASANDRA BANGALORE

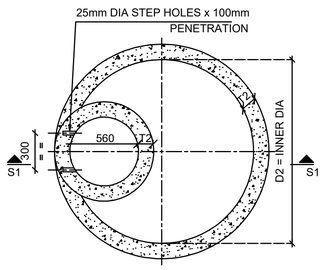
PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

DESIGNED: MKV	APPROVED	DATE: (TO ISSUE) 02/04/2025
DRAWN: SGS		DATE:(CURRENT ISSUE) 02/04/2025
CHECKED: BMS		DIVISION: CV
SCALE: –	DWG. NO. TN-KWSDRP-WBS5-CV-3014	ISSUE: P0

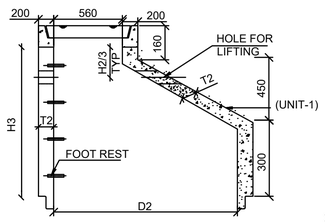
FILE NAME: TN-KWSDRP-WBS5-CV-3014_CHANNASANDRA-WWTP-20MLD.dwg

TITLE: RCC PRECAST SEWER MACHINE HOLE DETAILS 1200MM DIA (TYPICAL) FOR DEPTH UPTO 3.0M

DWG NO: TN-KWSDRP-WBS5-CV-3026



1 PLAN AT MACHINE HOLE TOP LVL
SCALE : NTS



3 DETAIL OF SEGMENT - H3(UNIT-1)
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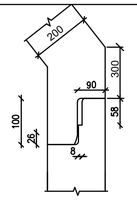
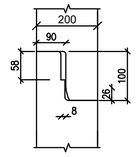
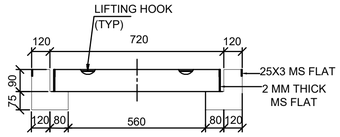


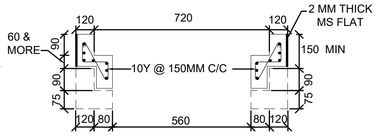
DETAIL OF 'Y'
TYP.JOINING DETAILS OF 1200 DIA PRECAST SEGMENT



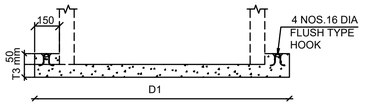
DETAILS OF 'Z'
TYP.JOINING DETAILS OF 1200 DIA PRECAST SEGMENT



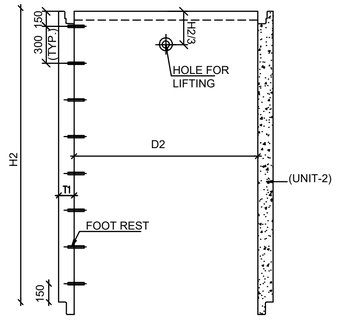
DETAIL OF 'X'
HD-20 MACHINE HOLE COVER



ADDITIONAL MACHINE HOLE HEIGHT TO MATCH FINISHED ROAD LEVEL



DETAILS OF BASE SLAB



4 DETAIL OF SEGMENT - H2(UNIT-2)
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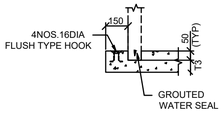
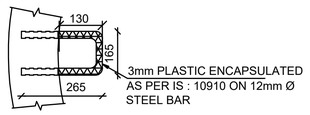
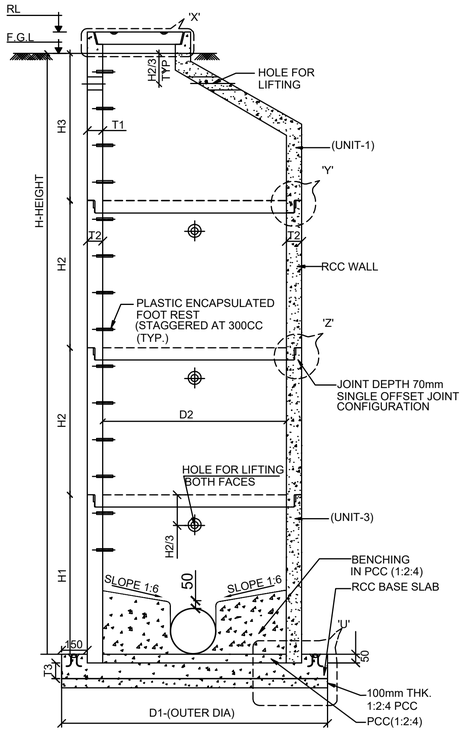


DETAIL OF 'U'



TYPICAL PLASTIC ENCAPSULATED FOOT REST DETAILS



2 SECTION S1-S1
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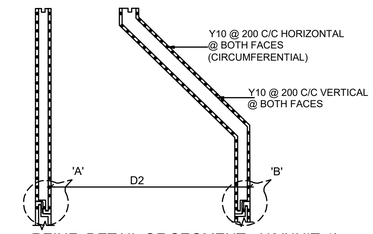

5 REINF. DETAIL OF SEGMENT - H3(UNIT-1)
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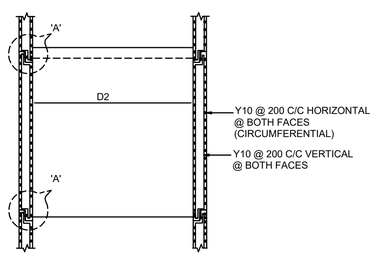

6 REINF. DETAIL OF SEGMENT - H2(UNIT-2)
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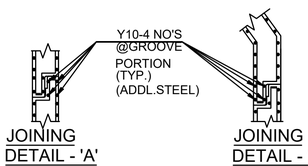
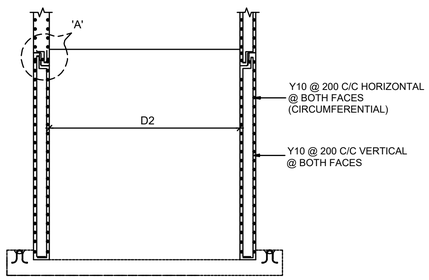


JOINING DETAIL - 'A'

JOINING DETAIL - 'B'



7 REINF. DETAIL OF SEGMENT - H1(UNIT-3)
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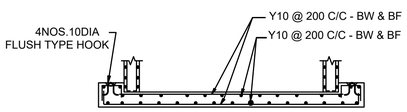


8 REINF. DETAIL OF BASE SLAB
SCALE : NTS

STANDARD DATA FOR PRECAST MACHINE HOLE								
1	**BASE SECTION**							PROVISION
a)	SIZE(DIAMETER) IN mm							1200
b)	DIA WISE DIMENSIONS							
	INNER DIA.OF BASE(D2) (mm)	WALL THK.(T1) (mm)	WALL THK.(T2) (mm)	JOINT DEPTH (mm)	BASE THK.(T3) (mm)	OUTER DIA.OF BASE(D1) (mm)	HEIGHT	
	1200	200	200	50	200	1900	UPTO 3m	
c)	AVAILABLE HEIGHT FOR BASE IN MM(H1)							300 TO 700 OR AS REQUIRED
d)	HOLES FOR SEWER CONNECTIONS							100mmØ MORE THAN OUTER Ø OF SEWER
e)	A)MAT CONCRETE THICKNESS IN MM & MIX							100mmTHICK,1:2:4 MIX
	B)CONCRETE MIX FOR WALL AND BASE							RCC M30 GRADE
f)	CONCRETE FILL FOR BENCHING							1:2:4, MIX WITH 1:6 SLOPE
g)	REINFORCEMENT							
	a)FOR BASE SLAB							AS PER RC DETAIL
	b)FOR WALL							AS PER RC DETAIL
2	**RISER SECTION**							
a)	AVAILABLE HEIGHT FOR RISER SECTION (H2)							300 TO 900 OR AS REQUIRED
b)	WALL THICKNESS IN MM							200mm
c)	JOINT THICKNESS AND JOINT MATERIAL							SAME AS BASE SECTION
d)	REINFORCEMENT IN THE WALL							AS PER DETAIL DRG.
3	**ECCENTRIC CONE SECTION**							
a)	SHAPE							ECCENTRIC CONE
b)	CONCRETE FILL AROUND SEWER							1:1.5:3MIX
c)	THICKNESS(T2)							200mm
d)	REINFORCEMENT							AS PER DETAIL DRG.
e)	TOP OPENING							560mm
f)	JOINT DEPTH							AS PER DETAIL DRG.
4	**STANDARD MACHINE HOLE FRAME AND COVER**							AS PER IS 12592-2002
a)	SHAPE							FLAT
b)	COVER SIZE							560mm
c)	SPECIFICATION							HD-20

NOTE:

1. ALL DIMENTIONS ARE IN mm AND ALL LEVELS ARE IN METER.
2. THE LIFTING HOLES SHALL BE FILLED WITH CONCRETE 1:1.5:3 MIX.
3. 3mm PVC ENCAPSULATE ON 12mm BAR, FOOT STEPS Fe 500.
4. THE NON CORE OPENING SHALL BE 100mm GREATER THAN THE OUTER DIA OF SEWER
5. SINGLE OFFSET JOINT CONFIGURATION SHALL BE ADOPTED AT THE JOINT.
6. THE JOINT SHALL BE SEALED WITH NON SHRINK GROUT/SINGLE RUBBER SEAL SHALL BE PROVIDED IN PRECAST UNITS.RUBBER GASKET SHALL BE AS PER IS 5382.
7. 150mm LIP IS OPTIONAL UNLESS OTHERWISE NOTED.
8. GRADE OF CONCRETE SHALL BE RCC M30 MIX FOR MANHOLE WALL AND FOR BASE SLAB WITH SULPHATE RESISTANCE CEMENT.
9. ALL REINFORCEMENT BARS SHALL BE HYSD CRS BARS OF GRADE Fe 500 CONFORMING TO IS:1786.
10. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE:
    a)WALL SOIL SEWAGE FACE=50mm
    b)BASE SLAB =50mm
11. THIS DRAWING IS ONLY TYPICAL CONSTRUCTION DRAWING. THE CONTRACTOR HAS TO TAKE PRIOR APPROVAL TO THE PROCESS OF MANUFACTURE OF THE PRECAST MANHOLE.
12. NET SAFE BEARING CAPACITY IS ASSUMED TO BE 10 TON/Sq.m. IF LOWER SBC ENCOUNTERED, THE BASE SLAB THICKNESS SHALL BE INCREASED AS PER DIRECTION OF ENGINEER.
13. PRE CAST FRAME AND COVER AS PER IS:12592-2002.
14. LOWEST FOOT REST SHALL NOT BE MORE THAN 300mm ABOVE BENCHING.
15. FOR MINIMUM DEPTH-MANHOLES(1.25m), WHEREVER OCCURS,THE CONICAL SECTION AND THE RISER SEGMENT (H1) MAY BE CAST AS A SINGLE UNIT BASED ON THE SITE CONDITIONS.
16. PROVISION FOR INCOMING SEWERS, HOUSE SERVICE CONNECTIONS IF ANY SHALL BE PROVIDED
17. PROVISION FOR DROP (FOR DROP ARRANGEMENT) IN MH's SHALL BE PROVIDED AS PER SITE REQUIREMENT AND AS DIRECTED
18. INCASE OF HIGHER DIAMETER PIPES, PROVISION FOR THE INCOMING AND OUTGOING SEWERS MAY BE PROVIDED IN TWO PRECAST MEMEBERS OR HEIGHT OF THE BOTTOM PRECAST MEMBERS MAY BE INCREASED
19. ADDITION REINFORCEMENT AS PER APPROVED DRAWINGS IN AND ALLROUND PIPE OPENINGS SHALL BE PROVIDED
20. INTERCONNECTION WITH INCOMING & OUTGOING SEWERS INCLUDING FIXING THEM WITH RCC M30 GRADE CONCRETE
21. THE WORK SHALL BE DONE AS PER BOQ, SPECIFICATIONS AND CONTRACT PROVISIONS.

LEGEND:

FGL	-FINISHED GROUND LEVEL
RL	-ROAD LEVEL
LVL	-LEVEL
THK.	THICKNESS
TYP.	-TYPICAL
BW	-BOTH WAYS
BF	-BOTH FACES
REINF	REINFORCEMENT
DIA	DIAMETER
NTS	NOT TO SCALE
CB	CIRCULAR BEAM
RCC	REINFORCED CEMENT CONCRETE
MAX	MAXIMUM
DI	DUCTILE IRON
ADDL	ADDITIONAL
PCC	PLAIN CEMENT CONCRETE
C/C	CENTER-TO-CENTER
HFL	HIGH FLOOD LEVEL
MIN	MINIMUM
M/S	MILD STEEL

ISSUE	DATE	DESCRIPTION	BY	CHECKED	APPD.
P0	02/04/2025	FOR TENDER PURPOSE	SGS	MKV	- - -

FOR TENDER PURPOSE ONLY

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY, SOLAR PANELS ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS [WORKS - A] AND PROCUREMENT AND CONSTRUCTION OF RISING MAIN, MAIN SEWERS AND LATERALS INCLUDING MACHINE HOLES AND LIFT SEWAGE PUMPING STATIONS [WORKS - B] HYBRID MODE FOR MAHADEVAPURA ZONES IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-5)

TITLE:

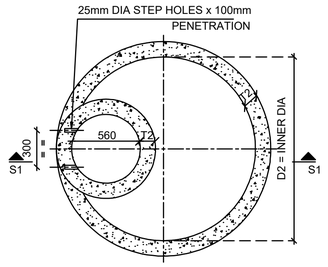
RCC PRECAST SEWER MACHINE HOLE DETAILS 1200mm DIA (TYPICAL) FOR DEPTH UPTO 3.0M

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

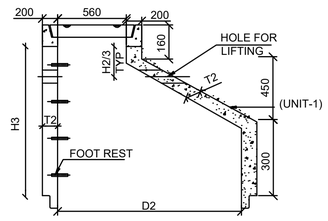
DESIGNED: MKV	APPROVED	DATE: (TO ISSUE) 02/04/2025
DRAWN: SGS		DATE: (CURRENT ISSUE) 02/04/2025
CHECKED: BMS		DIVISION: CV
SCALE: NTS	DWG. NO. TN-KWSDRP-WBS5-CV-3026	ISSUE: P0
FILE NAME: TN-KWSDRP-WBS5-CV-3026.dwg		A1 SIZE

TITLE: RCC PRECAST SEWER MACHINE HOLE DETAILS 1500MM DIA (TYPICAL) FOR DEPTH UPTO 3.0M

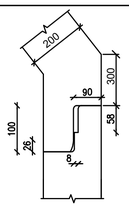
DWG NO: TN-KWSDRP-WBS5-CV-3027



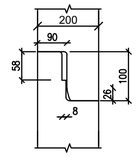
1 PLAN AT MACHINE HOLE TOP LVL
SCALE : NTS



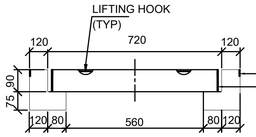
3 DETAIL OF SEGMENT - H3(UNIT-1)
SCALE : NTS



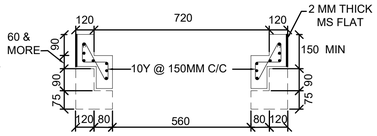
DETAIL OF 'Y'
TYP.JOINING DETAILS OF 1500 DIA PRECAST SEGMENT



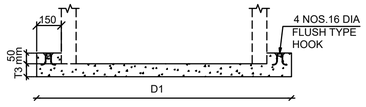
DETAILS OF 'Z'
TYP.JOINING DETAILS OF 1500 DIA PRECAST SEGMENT



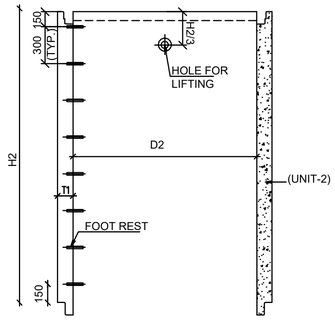
DETAIL OF 'X'
HD-20 MACHINE HOLE COVER



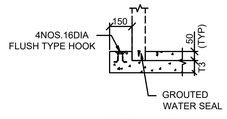
ADDITIONAL MACHINE HOLE HEIGHT TO MATCH FINISHED ROAD LEVEL



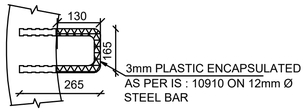
DETAILS OF BASE SLAB



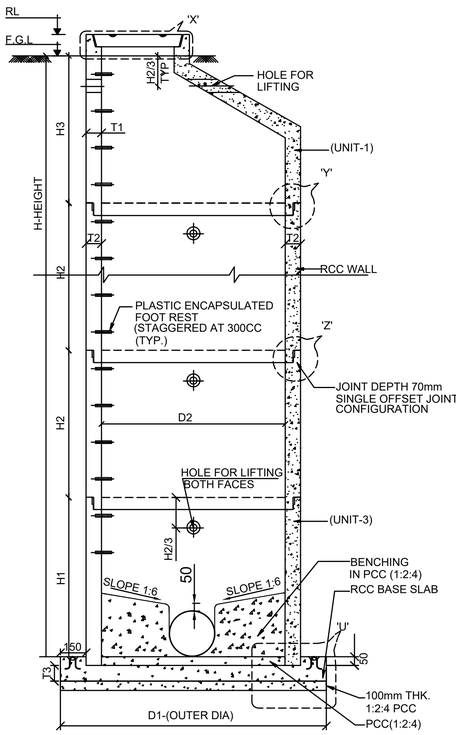
4 DETAIL OF SEGMENT - H2(UNIT-2)
SCALE : NTS



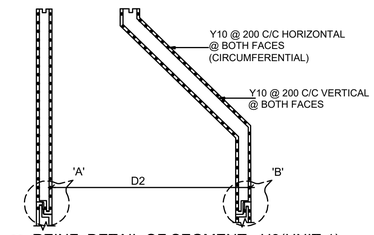
DETAIL OF 'U'



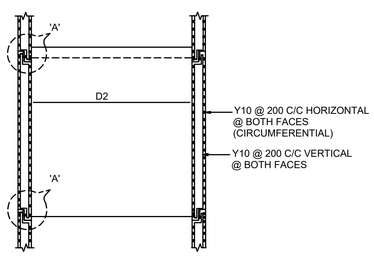
TYPICAL PLASTIC ENCAPSULATED FOOT REST DETAILS



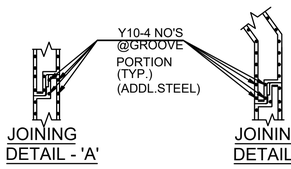
2 SECTION S1-S1
SCALE : NTS



5 REINF. DETAIL OF SEGMENT - H3(UNIT-1)
SCALE : NTS

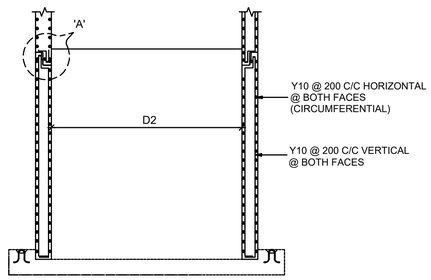


6 REINF. DETAIL OF SEGMENT - H2(UNIT-2)
SCALE : NTS

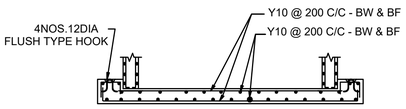


JOINING DETAIL - 'A'

JOINING DETAIL - 'B'



7 REINF. DETAIL OF SEGMENT - H1(UNIT-3)
SCALE : NTS



8 REINF. DETAIL OF BASE SLAB
SCALE : NTS

STANDARD DATA FOR PRECAST MANHOLE								
1	**BASE SECTION**							PROVISION
a)	SIZE(DIAMETER) IN mm							1500
b)	DIA WISE DIMENSIONS							
	INNER DIA.OF BASE(D2) (mm)	WALL THK.(T1) (mm)	WALL THK.(T2) (mm)	JOINT DEPTH (mm)	BASE THK.(T3) (mm)	OUTER DIA.OF BASE(D1) (mm)	HEIGHT	
	1500	200	200	50	250	2200	UPTO 3m	
c)	AVAILABLE HEIGHT FOR BASE IN MM(H1)							300 TO 700 OR AS REQUIRED
d)	HOLES FOR SEWER CONNECTIONS							100mmØ MORE THAN OUTER Ø OF SEWER
e)	A)MAT CONCRETE THICKNESS IN MM & MIX							100mmTHICK,1:2:4 MIX
	B)CONCRETE MIX FOR WALL AND BASE							RCC M30 GRADE
f)	CONCRETE FILL FOR BENCHING							1:2:4, MIX WITH 1:6 SLOPE
g)	REINFORCEMENT							
	a)FOR BASE SLAB							AS PER RC DETAIL
	b)FOR WALL							AS PER RC DETAIL
2	**RISER SECTION**							
a)	AVAILABLE HEIGHT FOR RISER SECTION (H2)							300 TO 900 OR AS REQUIRED
b)	WALL THICKNESS IN MM							200mm
c)	JOINT THICKNESS AND JOINT MATERIAL							SAME AS BASE SECTION
d)	REINFORCEMENT IN THE WALL							AS PER DETAIL DRG.
3	**ECCENTRIC CONE SECTION**							
a)	SHAPE							ECCENTRIC CONE
b)	CONCRETE FILL AROUND SEWER							1:1.5:3MIX
c)	THICKNESS(T2)							200mm
d)	REINFORCEMENT							AS PER DETAIL DRG.
e)	TOP OPENING							560mm
f)	JOINT DEPTH							AS PER DETAIL DRG.
4	**STANDARD** MACHINE HOLE **FRAME AND COVER**							AS PER IS 12592-2002
a)	SHAPE							FLAT
b)	COVER SIZE							560mm
c)	SPECIFICATION							HD-20

NOTE:

1. ALL DIMENTIONS ARE IN mm AND ALL LEVELS ARE IN METER.
2. THE LIFTING HOLES SHALL BE FILLED WITH CONCRETE 1:1.5:3 MIX.
3. 3mm PVC ENCAPSULATE ON 12mm BAR, FOOT STEPS Fe 500.
4. THE NON CORE OPENING SHALL BE 100mm GREATER THAN THE OUTER DIA OF SEWER
5. SINGLE OFFSET JOINT CONFIGURATION SHALL BE ADOPTED AT THE JOINT.
6. THE JOINT SHALL BE SEALED WITH NON SHRINK GROUT/SINGLE RUBBER SEAL SHALL BE PROVIDED IN PRECAST UNITS.RUBBER GASKET SHALL BE AS PER IS 5382.
7. 150mm LIP IS OPTIONAL UNLESS OTHERWISE NOTED.
8. GRADE OF CONCRETE SHALL BE RCC M30 MIX FOR MANHOLE WALL AND FOR BASE SLAB WITH SULPHATE RESISTANCE CEMENT.
9. ALL REINFORCEMENT BARS SHALL BE HYSD CRS BARS OF GRADE Fe 500 CONFORMING TO IS:1786.
10. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE:
    a)WALL SOIL SEWAGE FACE=50mm
    b)BASE SLAB =50mm
11. THIS DRAWING IS ONLY TYPICAL CONSTRUCTION DRAWING. THE CONTRACTOR HAS TO TAKE PRIOR APPROVAL TO THE PROCESS OF MANUFACTURE OF THE PRECAST MANHOLE.
12. NET SAFE BEARING CAPACITY IS ASSUMED TO BE 10 TON/Sq.m. IF LOWER SBC ENCOUNTERED, THE BASE SLAB THICKNESS SHALL BE INCREASED AS PER DIRECTION OF ENGINEER.
13. PRE CAST FRAME AND COVER AS PER IS:12592-2002.
14. LOWEST FOOT REST SHALL NOT BE MORE THAN 300mm ABOVE BENCHING.
15. FOR MINIMUM DEPTH-MANHOLES(1.25m), WHEREVER OCCURS,THE CONICAL SECTION AND THE RISER SEGMENT (H1) MAY BE CAST AS A SINGLE UNIT BASED ON THE SITE CONDITIONS.
16. PROVISION FOR INCOMING SEWERS, HOUSE SERVICE CONNECTIONS IF ANY SHALL BE PROVIDED
17. PROVISION FOR DROP (FOR DROP ARRANGEMENT) IN MH's SHALL BE PROVIDED AS PER SITE REQUIREMENT AND AS DIRECTED
18. INCASE OF HIGHER DIAMETER PIPES, PROVISION FOR THE INCOMING AND OUTGOING SEWERS MAY BE PROVIDED IN TWO PRECAST MEMEBERS OR HEIGHT OF THE BOTTOM PRECAST MEMBERS MAY BE INCREASED
19. ADDITION REINFORCEMENT AS PER APPROVED DRAWINGS IN AND ALLROUND PIPE OPENINGS SHALL BE PROVIDED
20. INTERCONNECTION WITH INCOMING & OUTGOING SEWERS INCLUDING FIXING THEM WITH RCC M30 GRADE CONCRETE
21. THE WORK SHALL BE DONE AS PER BOQ, SPECIFICATIONS AND CONTRACT PROVISIONS.

LEGEND:

FGL	FINISHED GROUND LEVEL
RL	REDUCED LEVEL
LVL	LEVEL
THK	THICKNESS
TYP	TYPICAL
BW	BOTH WAYS
BF	BOTH FACES
RF/REINF	REINFORCEMENT
DIA	DIAMETER
NTS	NOT TO SCALE
CB	CIRCULAR BEAM
RCC	REINFORCED CEMENT CONCRETE
MAX	MAXIMUM
DI	DUCTILE IRON
ADDL	ADDITIONAL
PCC	PLAIN CEMENT CONCRETE
C/C	CENTER-TO-CENTER
HFL	HIGH FLOOD LEVEL
MIN	MINIMUM
M/S	MILD STEEL

ISSUE	DATE	DESCRIPTION					
P0	02/04/2025	FOR TENDER PURPOSE	SGS	MKV	-	-	
			BY	CIVIL	-	-	APPD.
			CHECKED				

FOR TENDER PURPOSE ONLY

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY, SOLAR PANELS ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS [WORKS - A] AND PROCUREMENT AND CONSTRUCTION OF RISING MAIN, MAIN SEWERS AND LATERALS INCLUDING MACHINE HOLES AND LIFT SEWAGE PUMPING STATIONS [WORKS - B] HYBRID MODE FOR MAHADEVAPURA ZONES IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-5)

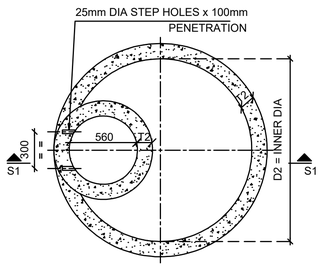
TITLE:
RCC PRECAST SEWER MACHINE HOLE DETAILS 1500mm DIA (TYPICAL) FOR DEPTH UPTO 3.0M

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

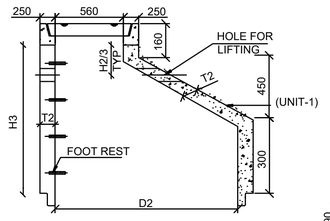
DESIGNED: MKV	APPROVED	DATE: (TO ISSUE) 02/04/2025
DRAWN: SGS		DATE: (CURRENT ISSUE) 02/04/2025
CHECKED: BMS		DIVISION: CV
SCALE: NTS	DWG. NO. TN-KWSDRP-WBS5-CV-3027	ISSUE: P0
FILE NAME: TN-KWSDRP-WBS5-CV-3027.dwg		A1 SIZE

TITLE: RCC PRECAST SEWER MACHINE HOLE DETAILS 1500MM DIA (TYPICAL) FOR DEPTH UPTO 7.0M

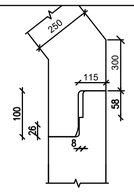
DWG NO: TN-KWSDRP-WBS5-CV-3028



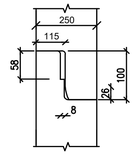
1 PLAN AT MACHINE HOLE TOP LVL
SCALE : NTS



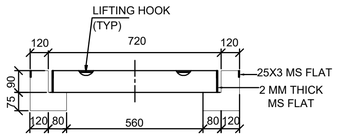
3 DETAIL OF SEGMENT - H3(UNIT-1)
SCALE : NTS



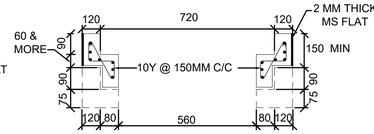
DETAIL OF 'Y'
TYP.JOINING DETAILS OF 1500 DIA PRECAST SEGMENT



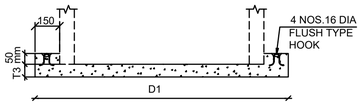
DETAILS OF 'Z'
TYP.JOINING DETAILS OF 1500 DIA PRECAST SEGMENT



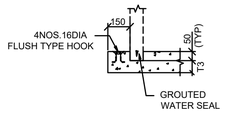
DETAIL OF 'X'
HD-20 MACHINE HOLE COVER



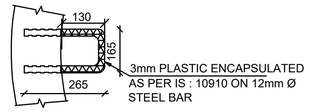
ADDITIONAL MACHINE HOLE HEIGHT TO MATCH FINISHED ROAD LEVEL



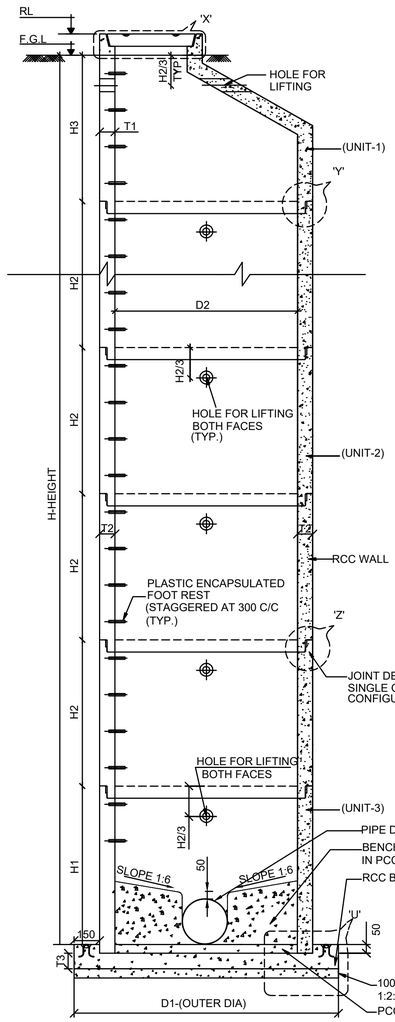
DETAILS OF BASE SLAB



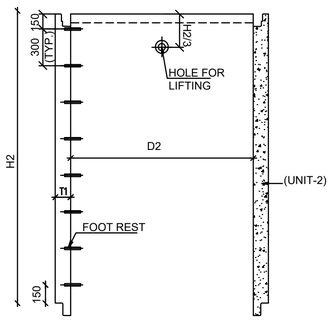
DETAIL OF 'U'



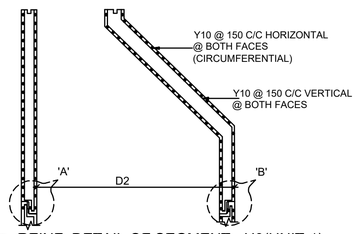
TYPICAL PLASTIC ENCAPSULATED FOOT REST DETAILS



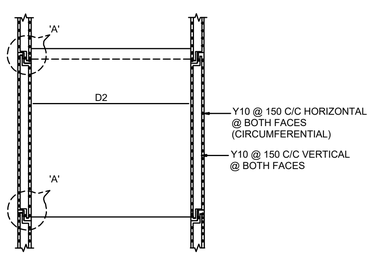
2 SECTION S1-S1
SCALE:NTS



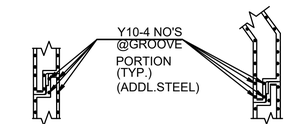
4 DETAIL OF SEGMENT - H2(UNIT-2)
SCALE : NTS



5 REINF. DETAIL OF SEGMENT - H3(UNIT-1)
SCALE : NTS

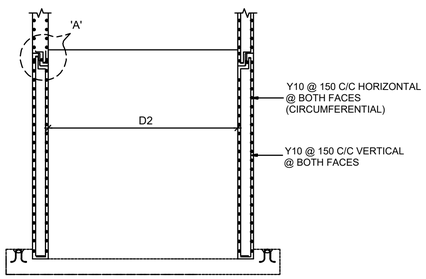


6 REINF. DETAIL OF SEGMENT - H2(UNIT-2)
SCALE : NTS

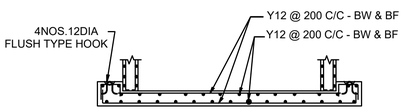


JOINING DETAIL - 'A'

JOINING DETAIL - 'B'



7 REINF. DETAIL OF SEGMENT - H1(UNIT-3)
SCALE : NTS



8 REINF. DETAIL OF BASE SLAB
SCALE : NTS

STANDARD DATA FOR PRECAST MACHINE HOLE								
1	**BASE SECTION**							PROVISION
a)	SIZE(DIAMETER) IN mm							1500
b)	DIA WISE DIMENSIONS							
	INNER DIA.OF BASE(D2) (mm)	WALL THK.(T1) (mm)	WALL THK.(T2) (mm)	JOINT DEPTH (mm)	BASE THK.(T3) (mm)	OUTER DIA.OF BASE(D1) (mm)	HEIGHT	
	1500	250	250	50	300	2300	UPTO 7m	
c)	AVAILABLE HEIGHT FOR BASE IN MM(H1)							300 TO 700 OR AS REQUIRED
d)	HOLES FOR SEWER CONNECTIONS							100mmØ MORE THAN OUTER Ø OF SEWER
e)	A)MAT CONCRETE THICKNESS IN MM & MIX							100mmTHICK,1:2:4 MIX
	B)CONCRETE MIX FOR WALL AND BASE							RCC M30 GRADE
f)	CONCRETE FILL FOR BENCHING							1:2:4, MIX WITH 1:6 SLOPE
g)	REINFORCEMENT							
	a)FOR BASE SLAB							AS PER RC DETAIL
	b)FOR WALL							AS PER RC DETAIL
2	**RISER SECTION**							
a)	AVAILABLE HEIGHT FOR RISER SECTION (H2)							300 TO 900 OR AS REQUIRED
b)	WALL THICKNESS IN MM							250mm
c)	JOINT THICKNESS AND JOINT MATERIAL							SAME AS BASE SECTION
d)	REINFORCEMENT IN THE WALL							AS PER DETAIL DRG.
3	**ECCENTRIC CONE SECTION**							
a)	SHAPE							ECCENTRIC CONE
b)	CONCRETE FILL AROUND SEWER							1:1.5:3MIX
c)	THICKNESS(T2)							250mm
d)	REINFORCEMENT							AS PER DETAIL DRG.
e)	TOP OPENING							560mm
f)	JOINT DEPTH							AS PER DETAIL DRG.
4	**STANDARD MACHINE HOLE FRAME AND COVER**							AS PER IS 12592-2002
a)	SHAPE							FLAT
b)	COVER SIZE							560mm
c)	SPECIFICATION							HD-20

NOTE:

1. ALL DIMENTIONS ARE IN mm AND ALL LEVELS ARE IN METER.
2. THE LIFTING HOLES SHALL BE FILLED WITH CONCRETE 1:1.5:3 MIX.
3. 3mm PVC ENCAPSULATE ON 12mm BAR, FOOT STEPS Fe 500.
4. THE NON CORE OPENING SHALL BE 100mm GREATER THAN THE OUTER DIA OF SEWER.
5. SINGLE OFFSET JOINT CONFIGURATION SHALL BE ADOPTED AT THE JOINT.
6. THE JOINT SHALL BE SEALED WITH NON SHRINK GROUT/SINGLE RUBBER SEAL SHALL BE PROVIDED IN PRECAST UNITS.RUBBER GASKET SHALL BE AS PER IS 5382.
7. 150mm LIP IS OPTIONAL UNLESS OTHERWISE NOTED.
8. GRADE OF CONCRETE SHALL BE RCC M30 MIX FOR MANHOLE WALL AND FOR BASE SLAB WITH SULPHATE RESISTANCE CEMENT.
9. ALL REINFORCEMENT BARS SHALL BE HYSD CRS BARS OF GRADE Fe 500 CONFORMING TO IS:1786.
10. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE:
    a)WALL SOIL SEWAGE FACE=50mm
    b)BASE SLAB =50mm
11. THIS DRAWING IS ONLY TYPICAL CONSTRUCTION DRAWING. THE CONTRACTOR HAS TO TAKE PRIOR APPROVAL TO THE PROCESS OF MANUFACTURE OF THE PRECAST MANHOLE.
12. NET SAFE BEARING CAPACITY IS ASSUMED TO BE 10 TON/Sq.m. IF LOWER SBC ENCOUNTERED, THE BASE SLAB THICKNESS SHALL BE INCREASED AS PER DIRECTION OF ENGINEER.
13. PRE CAST FRAME AND COVER AS PER IS:12592-2002.
14. LOWEST FOOT REST SHALL NOT BE MORE THAN 300mm ABOVE BENCHING.
15. FOR MINIMUM DEPTH-MANHOLES(1.25m), WHEREVER OCCURS,THE CONICAL SECTION AND THE RISER SEGMENT (H1) MAY BE CAST AS A SINGLE UNIT BASED ON THE SITE CONDITIONS.
16. PROVISION FOR INCOMING SEWERS, HOUSE SERVICE CONNECTIONS IF ANY SHALL BE PROVIDED
17. PROVISION FOR DROP (FOR DROP ARRANGEMENT) IN MH's SHALL BE PROVIDED AS PER SITE REQUIREMENT AND AS DIRECTED
18. INCASE OF HIGHER DIAMETER PIPES, PROVISION FOR THE INCOMING AND OUTGOING SEWERS MAY BE PROVIDED IN TWO PRECAST MEMEBERS OR HEIGHT OF THE BOTTOM PRECAST MEMBERS MAY BE INCREASED
19. ADDITION REINFORCEMENT AS PER APPROVED DRAWINGS IN AND ALLROUND PIPE OPENINGS SHALL BE PROVIDED
20. INTERCONNECTION WITH INCOMING & OUTGOING SEWERS INCLUDING FIXING THEM WITH RCC M30 GRADE CONCRETE
21. THE WORK SHALL BE DONE AS PER BOQ, SPECIFICATIONS AND CONTRACT PROVISIONS.

LEGEND:

FGL	-FINISHED GROUND LEVEL
RL	-ROAD LEVEL
LVL	-LEVEL
THK.	THICKNESS
TYP.	-TYPICAL
BW	-BOTH WAYS
BF	-BOTH FACES
REINF	REINFORCEMENT
DIA	DIAMETER
NTS	NOT TO SCALE
CB	CIRCULAR BEAM
RCC	REINFORCED CEMENT CONCRETE
MAX	MAXIMUM
DI	DUCTILE IRON
ADDL	ADDITIONAL
PCC	PLAIN CEMENT CONCRETE
C/C	CENTER-TO-CENTER
HFL	HIGH FLOOD LEVEL
MIN	MINIMUM
M/S	MILD STEEL

ISSUE	DATE	DESCRIPTION					
P0	02/04/2025	FOR TENDER PURPOSE	SGS	MKV	-	-	
			BY	CIVIL	-	-	APPD.
			CHECKED				

FOR TENDER PURPOSE ONLY

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY, SOLAR PANELS ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS [WORKS - A] AND PROCUREMENT AND CONSTRUCTION OF RISING MAIN, MAIN SEWERS AND LATERALS INCLUDING MACHINE HOLES AND LIFT SEWAGE PUMPING STATIONS [WORKS - B] HYBRID MODE FOR MAHADEVAPURA ZONES IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-5)

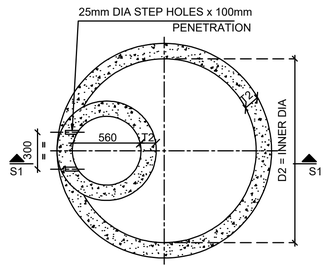
TITLE: RCC PRECAST SEWER MACHINE HOLE DETAILS 1500mm DIA (TYPICAL) FOR DEPTH UPTO 7.0M

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

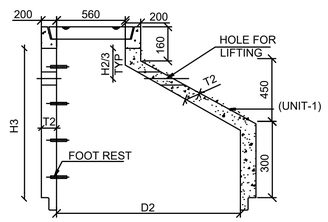
DESIGNED: MKV	APPROVED	DATE: (TO ISSUE) 02/04/2025
DRAWN: SGS		DATE: (CURRENT ISSUE) 02/04/2025
CHECKED: BMS		DIVISION: CV
SCALE: NTS	DWG. NO. TN-KWSDRP-WBS5-CV-3028	ISSUE: P0
FILE NAME: TN-KWSDRP-WBS5-CV-3028.dwg		A1 SIZE

TITLE: RCC PRECAST SEWER MACHINE HOLE DETAILS 1800MM DIA (TYPICAL) FOR DEPTH UPTO 3.0M

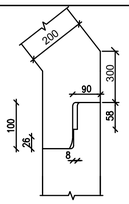
DWG NO: TN-KWSDRP-WBS5-CV-3029



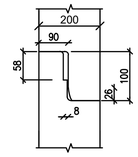
1 PLAN AT MACHINE HOLE TOP LVL
SCALE : NTS



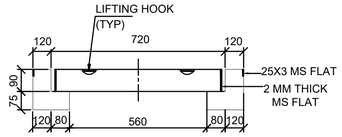
3 DETAIL OF SEGMENT - H3(UNIT-1)
SCALE : NTS



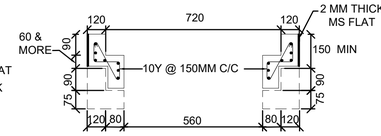
DETAIL OF 'Y'
TYP.JOINING DETAILS OF 1800 DIA PRECAST SEGMENT



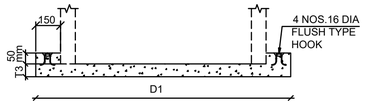
DETAILS OF 'Z'
TYP.JOINING DETAILS OF 1800 DIA PRECAST SEGMENT



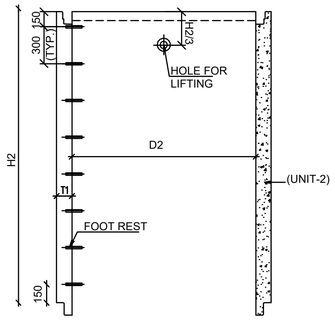
DETAIL OF 'X'
HD-20 MACHINE HOLE COVER



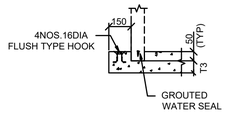
ADDITIONAL MACHINE HEIGHT TO MATCH FINISHED ROAD LEVEL



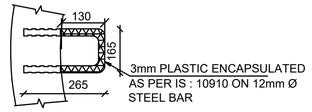
DETAILS OF BASE SLAB



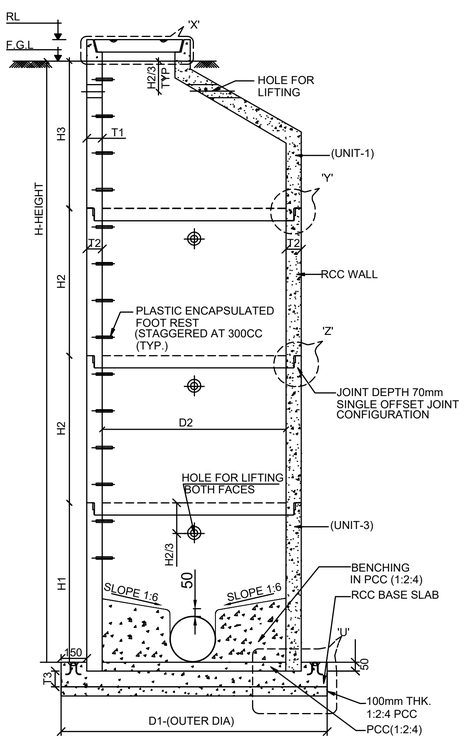
4 DETAIL OF SEGMENT - H2(UNIT-2)
SCALE : NTS



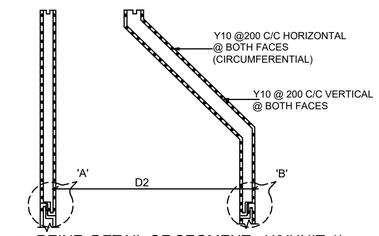
DETAIL OF 'U'



TYPICAL PLASTIC ENCAPSULATED FOOT REST DETAILS



2 SECTION S1-S1
SCALE : NTS



5 REINF. DETAIL OF SEGMENT - H3(UNIT-1)
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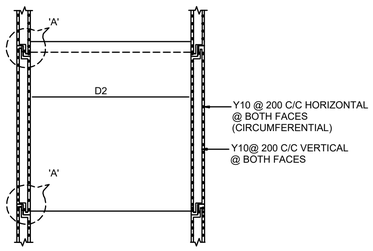
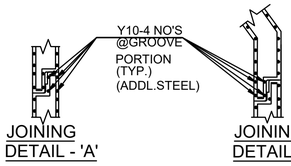
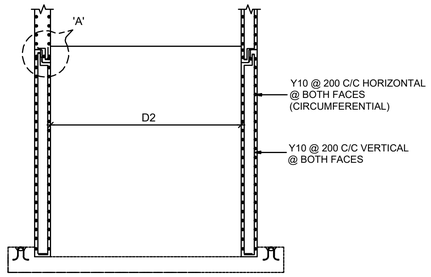


6 REINF. DETAIL OF SEGMENT - H2(UNIT-2)
SCALE : NTS

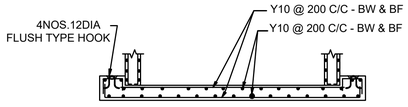


JOINING DETAIL - 'A'

JOINING DETAIL - 'B'



7 REINF. DETAIL OF SEGMENT - H1(UNIT-3)
SCALE : NTS



8 REINF. DETAIL OF BASE SLAB
SCALE : NTS

STANDARD DATA FOR PRECAST MACHINE HOLE								
1	**BASE SECTION**							PROVISION
a)	SIZE(DIAMETER) IN mm							1800
b)	DIA WISE DIMENSIONS							
	INNER DIA.OF BASE(D2) (mm)	WALL THK.(T1) (mm)	WALL THK.(T2) (mm)	JOINT DEPTH (mm)	BASE THK.(T3) (mm)	OUTER DIA.OF BASE(D1) (mm)	HEIGHT	
	1800	200	200	50	250	2500	UPTO 3m	
c)	AVAILABLE HEIGHT FOR BASE IN MM(H1)							300 TO 700 OR AS REQUIRED
d)	HOLES FOR SEWER CONNECTIONS							100mmØ MORE THAN OUTER Ø OF SEWER
e)	A)MAT CONCRETE THICKNESS IN MM & MIX							100mmTHICK,1:2:4 MIX
	B)CONCRETE MIX FOR WALL AND BASE							RCC M30 GRADE
f)	CONCRETE FILL FOR BENCHING							1:2:4, MIX WITH 1:6 SLOPE
g)	REINFORCEMENT							
	a)FOR BASE SLAB							AS PER RC DETAIL
	b)FOR WALL							AS PER RC DETAIL
2	**RISER SECTION**							
a)	AVAILABLE HEIGHT FOR RISER SECTION (H2)							300 TO 900 OR AS REQUIRED
b)	WALL THICKNESS IN MM							200mm
c)	JOINT THICKNESS AND JOINT MATERIAL							SAME AS BASE SECTION
d)	REINFORCEMENT IN THE WALL							AS PER DETAIL DRG.
3	**ECCENTRIC CONE SECTION**							
a)	SHAPE							ECCENTRIC CONE
b)	CONCRETE FILL AROUND SEWER							1:1.5:3MIX
c)	THICKNESS(T2)							200mm
d)	REINFORCEMENT							AS PER DETAIL DRG.
e)	TOP OPENING							560mm
f)	JOINT DEPTH							AS PER DETAIL DRG.
4	**STANDARD** MACHINE HOLE **FRAME AND COVER**							AS PER IS 12592-2002
a)	SHAPE							FLAT
b)	COVER SIZE							560mm
c)	SPECIFICATION							HD-20

NOTE:

1. ALL DIMENTIONS ARE IN mm AND ALL LEVELS ARE IN METER.
2. THE LIFTING HOLES SHALL BE FILLED WITH CONCRETE 1:1.5:3 MIX.
3. 3mm PVC ENCAPSULATE ON 12mm BAR, FOOT STEPS Fe 500.
4. THE NON CORE OPENING SHALL BE 100mm GREATER THAN THE OUTER DIA OF SEWER
5. SINGLE OFFSET JOINT CONFIGURATION SHALL BE ADOPTED AT THE JOINT.
6. THE JOINT SHALL BE SEALED WITH NON SHRINK GROUT/SINGLE RUBBER SEAL SHALL BE PROVIDED IN PRECAST UNITS.RUBBER GASKET SHALL BE AS PER IS 5382.
7. 150mm LIP IS OPTIONAL UNLESS OTHERWISE NOTED.
8. GRADE OF CONCRETE SHALL BE RCC M30 MIX FOR MANHOLE WALL AND FOR BASE SLAB WITH SULPHATE RESISTANCE CEMENT.
9. ALL REINFORCEMENT BARS SHALL BE HYSD CRS BARS OF GRADE Fe 500 CONFORMING TO IS:1786.
10. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE:
    a)WALL SOIL SEWAGE FACE=50mm
    b)BASE SLAB =50mm
11. THIS DRAWING IS ONLY TYPICAL CONSTRUCTION DRAWING. THE CONTRACTOR HAS TO TAKE PRIOR APPROVAL TO THE PROCESS OF MANUFACTURE OF THE PRECAST MANHOLE.
12. NET SAFE BEARING CAPACITY IS ASSUMED TO BE 10 TON/Sq.m. IF LOWER SBC ENCOUNTERED, THE BASE SLAB THICKNESS SHALL BE INCREASED AS PER DIRECTION OF ENGINEER.
13. PRE CAST FRAME AND COVER AS PER IS:12592-2002.
14. LOWEST FOOT REST SHALL NOT BE MORE THAN 300mm ABOVE BENCHING.
15. FOR MINIMUM DEPTH-MANHOLES(1.25m), WHEREVER OCCURS,THE CONICAL SECTION AND THE RISER SEGMENT (H1) MAY BE CAST AS A SINGLE UNIT BASED ON THE SITE CONDITIONS.
16. PROVISION FOR INCOMING SEWERS, HOUSE SERVICE CONNECTIONS IF ANY SHALL BE PROVIDED
17. PROVISION FOR DROP (FOR DROP ARRANGEMENT) IN MH's SHALL BE PROVIDED AS PER SITE REQUIREMENT AND AS DIRECTED
18. INCASE OF HIGHER DIAMETER PIPES, PROVISION FOR THE INCOMING AND OUTGOING SEWERS MAY BE PROVIDED IN TWO PRECAST MEMEBERS OR HEIGHT OF THE BOTTOM PRECAST MEMBERS MAY BE INCREASED
19. ADDITION REINFORCEMENT AS PER APPROVED DRAWINGS IN AND ALLROUND PIPE OPENINGS SHALL BE PROVIDED
20. INTERCONNECTION WITH INCOMING & OUTGOING SEWERS INCLUDING FIXING THEM WITH RCC M30 GRADE CONCRETE
21. THE WORK SHALL BE DONE AS PER BOQ, SPECIFICATIONS AND CONTRACT PROVISIONS.

LEGEND:

FGL	-FINISHED GROUND LEVEL
RL	-ROAD LEVEL
LVL	-LEVEL
THK	THICKNESS
TYP.	-TYPICAL
BW	-BOTH WAYS
BF	-BOTH FACES
REINF	REINFORCEMENT
DIA	DIAMETER
NTS	NOT TO SCALE
CB	CIRCULAR BEAM
RCC	REINFORCED CEMENT CONCRETE
MAX	MAXIMUM
DI	DUCTILE IRON
ADDL	ADDITIONAL
PCC	PLAIN CEMENT CONCRETE
C/C	CENTER-TO-CENTER
HFL	HIGH FLOOD LEVEL
MIN	MINIMUM
M/S	MILD STEEL

ISSUE	DATE	DESCRIPTION	BY	CHECKED	APPD.
P0	02/04/2025	FOR TENDER PURPOSE	SGS	MKV - -	

FOR TENDER PURPOSE ONLY

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY, SOLAR PANELS ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS [WORKS - A] AND PROCUREMENT AND CONSTRUCTION OF RISING MAIN, MAIN SEWERS AND LATERALS INCLUDING MACHINE HOLES AND LIFT SEWAGE PUMPING STATIONS [WORKS - B] HYBRID MODE FOR MAHADEVAPURA ZONES IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-5)

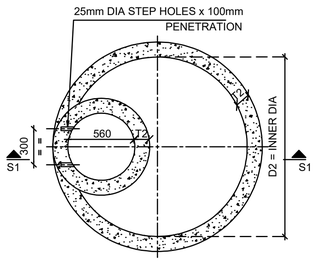
TITLE:
RCC PRECAST SEWER MACHINE HOLE DETAILS 1800mm DIA (TYPICAL) FOR DEPTH UPTO 3.0M

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

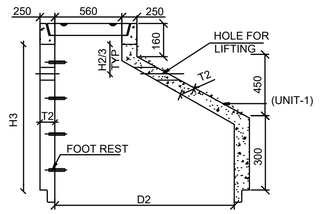
DESIGNED: MKV	APPROVED	DATE: (TO ISSUE) 02/04/2025
DRAWN: SGS		DATE: (CURRENT ISSUE) 02/04/2025
CHECKED: BMS		DIVISION: CV
SCALE: NTS	DWG. NO. TN-KWSDRP-WBS5-CV-3029	ISSUE: P0
FILE NAME: TN-KWSDRP-WBS5-CV-3029.dwg		A1 SIZE

TITLE: RCC PRECAST SEWER MACHINE HOLE DETAILS 1800MM DIA (TYPICAL) FOR DEPTH UPTO 6.0M

DWG NO: TN-KWSDRP-WBS5-CV-3030



1 PLAN AT MACHINE HOLE TOP LVL
SCALE : NTS



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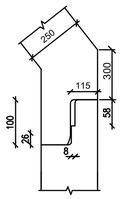
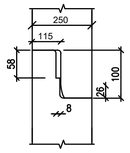
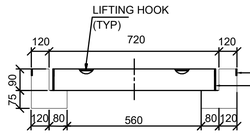
SCALE : NTS



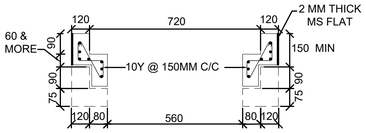
DETAIL OF 'Y'
TYP.JOINING DETAILS OF 1800 DIA PRECAST SEGMENT



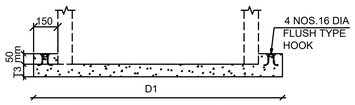
DETAILS OF 'Z'
TYP.JOINING DETAILS OF 1800 DIA PRECAST SEGMENT



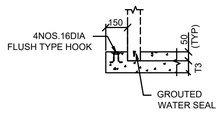
DETAIL OF 'X'
HD-20 MACHINE HOLE COVER



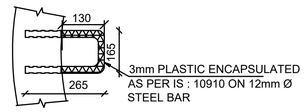
ADDITIONAL MACHINE HEIGHT TO MATCH FINISHED ROAD LEVEL



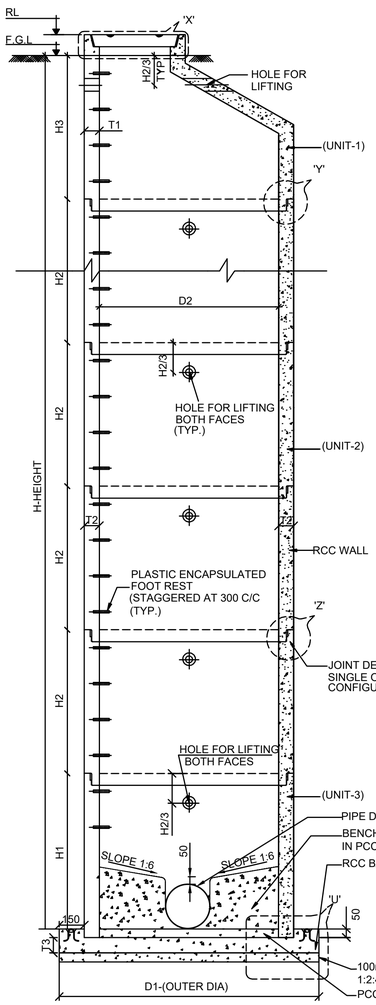
DETAILS OF BASE SLAB



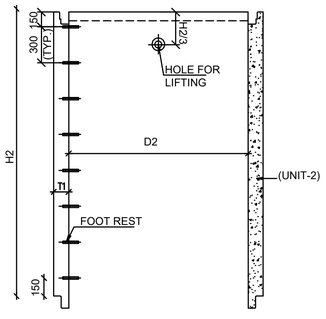
DETAIL OF 'U'



TYPICAL PLASTIC ENCAPSULATED FOOT REST DETAILS



2 SECTION S1-S1
SCALE:NTS



4 DETAIL OF SEGMENT - H2(UNIT-2)
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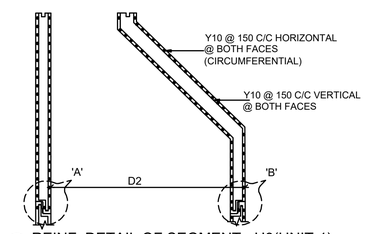

5 REINF. DETAIL OF SEGMENT - H3(UNIT-1)
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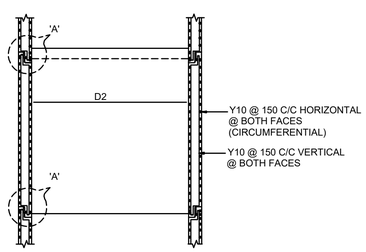

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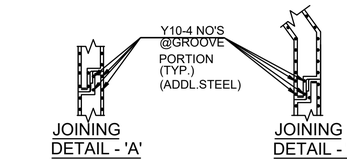
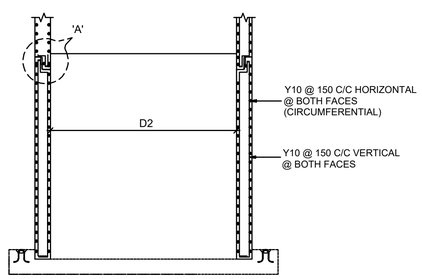
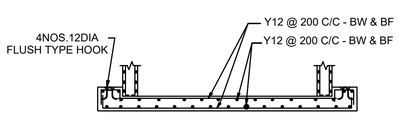
SCALE : NTS



JOINING DETAIL - 'A' JOINING DETAIL - 'B'



7 REINF. DETAIL OF SEGMENT - H1(UNIT-3)
SCALE : NTS



8 REINF. DETAIL OF BASE SLAB
SCALE : NTS

STANDARD DATA FOR PRECAST MACHINE HOLE								
1	**BASE SECTION**							PROVISION
a)	SIZE(DIAMETER) IN mm							1800
b)	DIA WISE DIMENSIONS							
	INNER DIA.OF BASE(D2) (mm)	WALL THK.(T1) (mm)	WALL THK.(T2) (mm)	JOINT DEPTH (mm)	BASE THK.(T3) (mm)	OUTER DIA.OF BASE(D1) (mm)	HEIGHT	
	1800	250	250	50	300	2600	UPTO 6m	
c)	AVAILABLE HEIGHT FOR BASE IN MM(H1)							300 TO 700 OR AS REQUIRED
d)	HOLES FOR SEWER CONNECTIONS							100mmØ MORE THAN OUTER Ø OF SEWER
e)	A)MAT CONCRETE THICKNESS IN MM & MIX							100mmTHICK,1:2:4 MIX
	B)CONCRETE MIX FOR WALL AND BASE							RCC M30 GRADE
f)	CONCRETE FILL FOR BENCHING							1:2:4, MIX WITH 1:6 SLOPE
g)	REINFORCEMENT							
	a)FOR BASE SLAB							AS PER RC DETAIL
	b)FOR WALL							AS PER RC DETAIL
2	**RISER SECTION**							
a)	AVAILABLE HEIGHT FOR RISER SECTION (H2)							300 TO 900 OR AS REQUIRED
b)	WALL THICKNESS IN MM							250mm
c)	JOINT THICKNESS AND JOINT MATERIAL							SAME AS BASE SECTION
d)	REINFORCEMENT IN THE WALL							AS PER DETAIL DRG.
3	**ECCENTRIC CONE SECTION**							
a)	SHAPE							ECCENTRIC CONE
b)	CONCRETE FILL AROUND SEWER							1:1.5:3MIX
c)	THICKNESS(T2)							250mm
d)	REINFORCEMENT							AS PER DETAIL DRG.
e)	TOP OPENING							560mm
f)	JOINT DEPTH							AS PER DETAIL DRG.
4	**STANDARD** MACHINE HOLE **FRAME AND COVER**							AS PER IS 12592-2002
a)	SHAPE							FLAT
b)	COVER SIZE							560mm
c)	SPECIFICATION							HD-20

NOTE:

1. ALL DIMENTIONS ARE IN mm AND ALL LEVELS ARE IN METER.
2. THE LIFTING HOLES SHALL BE FILLED WITH CONCRETE 1:1.5:3 MIX.
3. 3mm PVC ENCAPSULATE ON 12mm BAR, FOOT STEPS Fe 500.
4. THE NON CORE OPENING SHALL BE 100mm GREATER THAN THE OUTER DIA OF SEWER.
5. SINGLE OFFSET JOINT CONFIGURATION SHALL BE ADOPTED AT THE JOINT.
6. THE JOINT SHALL BE SEALED WITH NON SHRINK GROUT/SINGLE RUBBER SEAL SHALL BE PROVIDED IN PRECAST UNITS.RUBBER GASKET SHALL BE AS PER IS 5382.
7. 150mm LIP IS OPTIONAL UNLESS OTHERWISE NOTED.
8. GRADE OF CONCRETE SHALL BE RCC M30 MIX FOR MANHOLE WALL AND FOR BASE SLAB WITH SULPHATE RESISTANCE CEMENT.
9. ALL REINFORCEMENT BARS SHALL BE HYSD CRS BARS OF GRADE Fe 500 CONFORMING TO IS:1786.
10. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE:
    a)WALL SOIL SEWAGE FACE=50mm
    b)BASE SLAB =50mm
11. THIS DRAWING IS ONLY TYPICAL CONSTRUCTION DRAWING. THE CONTRACTOR HAS TO TAKE PRIOR APPROVAL TO THE PROCESS OF MANUFACTURE OF THE PRECAST MANHOLE.
12. NET SAFE BEARING CAPACITY IS ASSUMED TO BE 10 TON/Sq.m. IF LOWER SBC ENCOUNTERED, THE BASE SLAB THICKNESS SHALL BE INCREASED AS PER DIRECTION OF ENGINEER.
13. PRE CAST FRAME AND COVER AS PER IS:12592-2002.
14. LOWEST FOOT REST SHALL NOT BE MORE THAN 300mm ABOVE BENCHING.
15. FOR MINIMUM DEPTH-MANHOLES(1.25m), WHEREVER OCCURS,THE CONICAL SECTION AND THE RISER SEGMENT (H1) MAY BE CAST AS A SINGLE UNIT BASED ON THE SITE CONDITIONS.
16. PROVISION FOR INCOMING SEWERS, HOUSE SERVICE CONNECTIONS IF ANY SHALL BE PROVIDED
17. PROVISION FOR DROP (FOR DROP ARRANGEMENT) IN MH's SHALL BE PROVIDED AS PER SITE REQUIREMENT AND AS DIRECTED
18. INCASE OF HIGHER DIAMETER PIPES, PROVISION FOR THE INCOMING AND OUTGOING SEWERS MAY BE PROVIDED IN TWO PRECAST MEMEBERS OR HEIGHT OF THE BOTTOM PRECAST MEMBERS MAY BE INCREASED
19. ADDITION REINFORCEMENT AS PER APPROVED DRAWINGS IN AND ALLROUND PIPE OPENINGS SHALL BE PROVIDED
20. INTERCONNECTION WITH INCOMING & OUTGOING SEWERS INCLUDING FIXING THEM WITH RCC M30 GRADE CONCRETE
21. THE WORK SHALL BE DONE AS PER BOQ, SPECIFICATIONS AND CONTRACT PROVISIONS.

LEGEND:

FGL	FINISHED GROUND LEVEL
RL	REDUCED LEVEL
LVL	LEVEL
THK	THICKNESS
TYP	TYPICAL
BW	BOTH WAYS
BF	BOTH FACES
RF/REINF	REINFORCEMENT
DIA	DIAMETER
NTS	NOT TO SCALE
CB	CIRCULAR BEAM
RCC	REINFORCED CEMENT CONCRETE
MAX	MAXIMUM
DI	DUCTILE IRON
ADDL	ADDITIONAL
PCC	PLAIN CEMENT CONCRETE
C/C	CENTER-TO-CENTER
HFL	HIGH FLOOD LEVEL
MIN	MINIMUM
M/S	MILD STEEL

ISSUE	DATE	DESCRIPTION					
P0	02/04/2025	FOR TENDER PURPOSE	SGS	MKV	-	-	
			BY	CIVIL	-	-	APPD.
			CHECKED				

FOR TENDER PURPOSE ONLY

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TITLE: RCC PRECAST SEWER MACHINE HOLE DETAILS 1800mm DIA (TYPICAL) FOR DEPTH UPTO 6.0M

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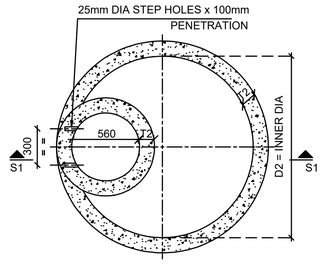
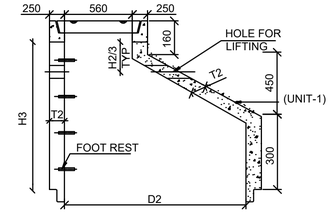
SCALE: AS SHOWN	DWG. NO. TN-KWSDRP-WBS5-CV-3030	ISSUE: P0
FILE NAME: TN-KWSDRP-WBS5-CV-3030.dwg		A1 SIZE

TITLE: RCC PRECAST SEWER MACHINE HOLE DETAILS 1800MM DIA (TYPICAL) FOR DEPTH UPTO 8.0M

DWG NO: TN-KWSDRP-WBS5-CV-3031



1 PLAN AT MACHINE HOLE TOP LVL
SCALE : NTS



3 DETAIL OF SEGMENT - H3(UNIT-1)
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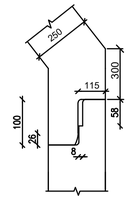
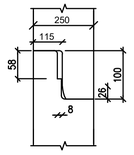
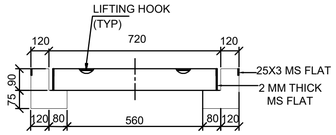


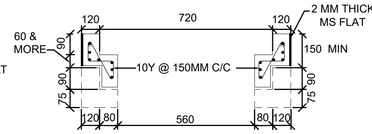
DETAIL OF 'Y'
TYP.JOINING DETAILS OF 1800 DIA PRECAST SEGMENT



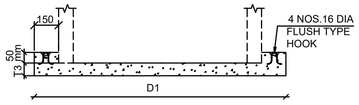
DETAILS OF 'Z'
TYP.JOINING DETAILS OF 1800 DIA PRECAST SEGMENT



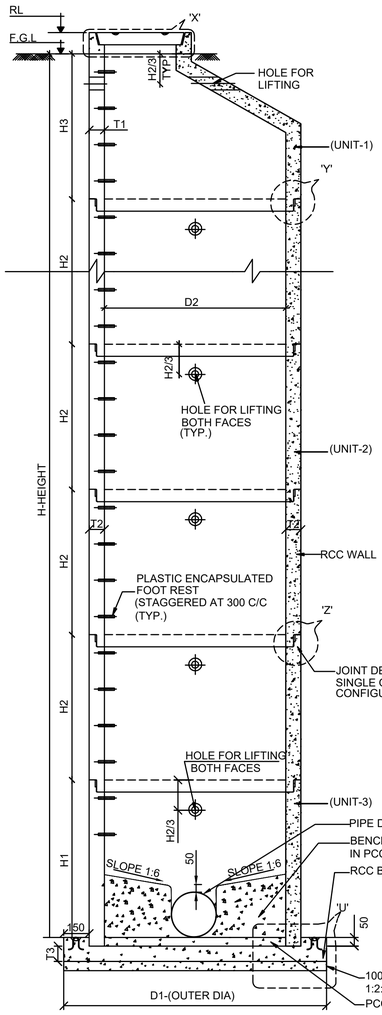
DETAIL OF 'X'
HD-20 MACHINE HOLE COVER



ADDITIONAL MACHINE HOLE HEIGHT TO MATCH FINISHED ROAD LEVEL



DETAILS OF BASE SLAB



2 SECTION S1-S1
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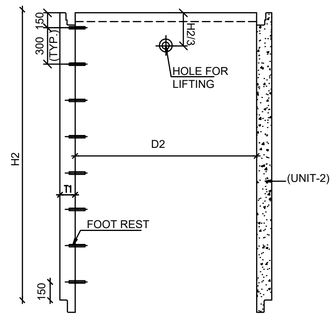
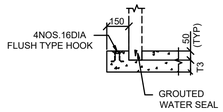
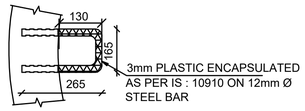


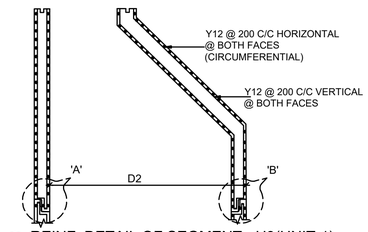
4 DETAIL OF SEGMENT - H2(UNIT-2)
SCALE : NTS



DETAIL OF 'U'



TYPICAL PLASTIC ENCAPSULATED FOOT REST DETAILS



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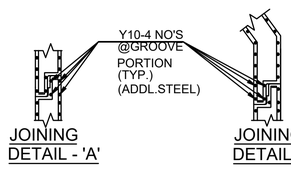
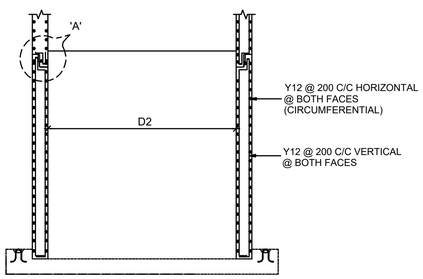


JOINING DETAIL - 'A'

JOINING DETAIL - 'B'



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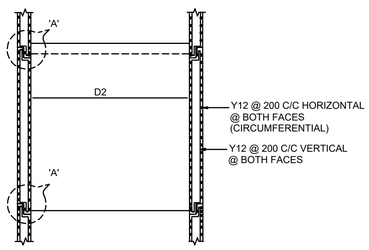

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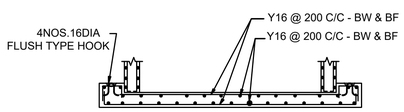


8 REINF. DETAIL OF BASE SLAB
SCALE : NTS

STANDARD DATA FOR PRECAST MACHINE HOLE								
1	**BASE SECTION**							PROVISION
a)	SIZE(DIAMETER) IN mm							1800
b)	DIA WISE DIMENSIONS							
	INNER DIA.OF BASE(D2) (mm)	WALL THK.(T1) (mm)	WALL THK.(T2) (mm)	JOINT DEPTH (mm)	BASE THK.(T3) (mm)	OUTER DIA.OF BASE(D1) (mm)	HEIGHT	
	1800	250	250	50	350	2600	UPTO 8m	
c)	AVAILABLE HEIGHT FOR BASE IN MM(H1)							300 TO 700 OR AS REQUIRED
d)	HOLES FOR SEWER CONNECTIONS							100mmØ MORE THAN OUTER Ø OF SEWER
e)	A)MAT CONCRETE THICKNESS IN MM & MIX							100mmTHICK,1:2:4 MIX
	B)CONCRETE MIX FOR WALL AND BASE							RCC M30 GRADE
f)	CONCRETE FILL FOR BENCHING							1:2:4, MIX WITH 1:6 SLOPE
g)	REINFORCEMENT							
	a)FOR BASE SLAB							AS PER RC DETAIL
	b)FOR WALL							AS PER RC DETAIL
2	**RISER SECTION**							
a)	AVAILABLE HEIGHT FOR RISER SECTION (H2)							300 TO 900 OR AS REQUIRED
b)	WALL THICKNESS IN MM							250mm
c)	JOINT THICKNESS AND JOINT MATERIAL							SAME AS BASE SECTION
d)	REINFORCEMENT IN THE WALL							AS PER DETAIL DRG.
3	**ECCENTRIC CONE SECTION**							
a)	SHAPE							ECCENTRIC CONE
b)	CONCRETE FILL AROUND SEWER							1:1.5:3MIX
c)	THICKNESS(T2)							250mm
d)	REINFORCEMENT							AS PER DETAIL DRG.
e)	TOP OPENING							560mm
f)	JOINT DEPTH							AS PER DETAIL DRG.
4	**STANDARD** MACHINE HOLE **FRAME AND COVER**							AS PER IS 12592-2002
a)	SHAPE							FLAT
b)	COVER SIZE							560mm
c)	SPECIFICATION							HD-20

NOTE:

1. ALL DIMENTIONS ARE IN mm AND ALL LEVELS ARE IN METER.
2. THE LIFTING HOLES SHALL BE FILLED WITH CONCRETE 1:1.5:3 MIX.
3. 3mm PVC ENCAPSULATE ON 12mm BAR, FOOT STEPS Fe 500.
4. THE NON CORE OPENING SHALL BE 100mm GREATER THAN THE OUTER DIA OF SEWER
5. SINGLE OFFSET JOINT CONFIGURATION SHALL BE ADOPTED AT THE JOINT.
6. THE JOINT SHALL BE SEALED WITH NON SHRINK GROUT/SINGLE RUBBER SEAL SHALL BE PROVIDED IN PRECAST UNITS.RUBBER GASKET SHALL BE AS PER IS 5382.
7. 150mm LIP IS OPTIONAL UNLESS OTHERWISE NOTED.
8. GRADE OF CONCRETE SHALL BE RCC M30 MIX FOR MANHOLE WALL AND FOR BASE SLAB WITH SULPHATE RESISTANCE CEMENT.
9. ALL REINFORCEMENT BARS SHALL BE HYSD CRS BARS OF GRADE Fe 500 CONFORMING TO IS:1786.
10. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE:
    a)WALL SOIL SEWAGE FACE=50mm
    b)BASE SLAB =50mm
11. THIS DRAWING IS ONLY TYPICAL CONSTRUCTION DRAWING. THE CONTRACTOR HAS TO TAKE PRIOR APPROVAL TO THE PROCESS OF MANUFACTURE OF THE PRECAST MANHOLE.
12. NET SAFE BEARING CAPACITY IS ASSUMED TO BE 10 TON/Sq.m. IF LOWER SBC ENCOUNTERED, THE BASE SLAB THICKNESS SHALL BE INCREASED AS PER DIRECTION OF ENGINEER.
13. PRE CAST FRAME AND COVER AS PER IS:12592-2002.
14. LOWEST FOOT REST SHALL NOT BE MORE THAN 300mm ABOVE BENCHING.
15. FOR MINIMUM DEPTH-MANHOLES(1.25m), WHEREVER OCCURS,THE CONICAL SECTION AND THE RISER SEGMENT (H1) MAY BE CAST AS A SINGLE UNIT BASED ON THE SITE CONDITIONS.
16. PROVISION FOR INCOMING SEWERS, HOUSE SERVICE CONNECTIONS IF ANY SHALL BE PROVIDED
17. PROVISION FOR DROP (FOR DROP ARRANGEMENT) IN MH's SHALL BE PROVIDED AS PER SITE REQUIREMENT AND AS DIRECTED
18. INCASE OF HIGHER DIAMETER PIPES, PROVISION FOR THE INCOMING AND OUTGOING SEWERS MAY BE PROVIDED IN TWO PRECAST MEMEBERS OR HEIGHT OF THE BOTTOM PRECAST MEMBERS MAY BE INCREASED
19. ADDITION REINFORCEMENT AS PER APPROVED DRAWINGS IN AND ALLROUND PIPE OPENINGS SHALL BE PROVIDED
20. INTERCONNECTION WITH INCOMING & OUTGOING SEWERS INCLUDING FIXING THEM WITH RCC M30 GRADE CONCRETE
21. THE WORK SHALL BE DONE AS PER BOQ, SPECIFICATIONS AND CONTRACT PROVISIONS.

LEGEND:

FGL	FINISHED GROUND LEVEL
RL	REDUCED LEVEL
LVL	LEVEL
THK	THICKNESS
TYP	TYPICAL
BW	BOTH WAYS
BF	BOTH FACES
RF/REINF	REINFORCEMENT
DIA	DIAMETER
NTS	NOT TO SCALE
CB	CIRCULAR BEAM
RCC	REINFORCED CEMENT CONCRETE
MAX	MAXIMUM
DI	DUCTILE IRON
ADDL	ADDITIONAL
PCC	PLAIN CEMENT CONCRETE
C/C	CENTER-TO-CENTER
HFL	HIGH FLOOD LEVEL
MIN	MINIMUM
M/S	MILD STEEL

ISSUE	DATE	DESCRIPTION					
P0	02/04/2025	FOR TENDER PURPOSE	SGS	MKV	-	-	
			BY	CIVIL	-	-	APPD.
			CHECKED				

FOR TENDER PURPOSE ONLY

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY, SOLAR PANELS ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS [WORKS - A] AND PROCUREMENT AND CONSTRUCTION OF RISING MAIN, MAIN SEWERS AND LATERALS INCLUDING MACHINE HOLES AND LIFT SEWAGE PUMPING STATIONS [WORKS - B] HYBRID MODE FOR MAHADEVAPURA ZONES IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-5)

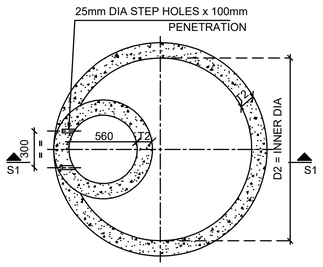
TITLE:
RCC PRECAST SEWER MACHINE HOLE DETAILS 1800mm DIA (TYPICAL) FOR DEPTH UPTO 8.0M

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

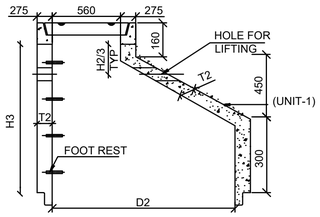
DESIGNED: MKV	APPROVED	DATE: (TO ISSUE) 02/04/2025
DRAWN: SGS		DATE: (CURRENT ISSUE) 02/04/2025
CHECKED: BMS		DIVISION: CV
SCALE: NTS	DWG. NO. TN-KWSDRP-WBS5-CV-3031	ISSUE: P0
FILE NAME: TN-KWSDRP-WBS5-CV-3031.dwg		A1 SIZE

TITLE: RCC PRECAST SEWER MACHINE HOLE DETAILS 1800MM DIA (TYPICAL) FOR DEPTH UPTO 10.0M

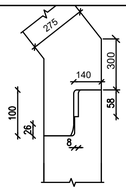
DWG NO: TN-KWSDRP-WBS5-CV-3032



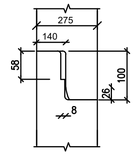
1 PLAN AT MACHINE HOLE TOP LVL
SCALE : NTS



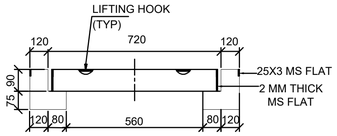
3 DETAIL OF SEGMENT - H3(UNIT-1)
SCALE : NTS



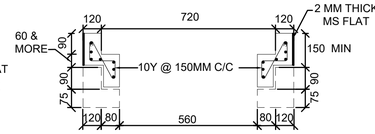
DETAIL OF 'Y'
TYP.JOINING DETAILS OF 1800 DIA PRECAST SEGMENT



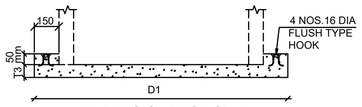
DETAILS OF 'Z'
TYP.JOINING DETAILS OF 1800 DIA PRECAST SEGMENT



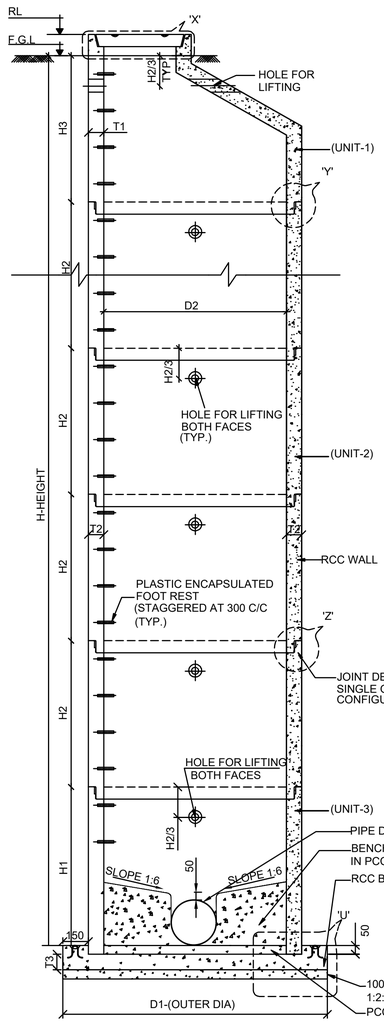
DETAIL OF 'X'
HD-20 MACHINE HOLE COVER



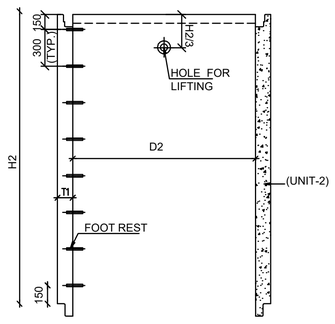
ADDITIONAL MACHINE HOLE HEIGHT TO MATCH FINISHED ROAD LEVEL



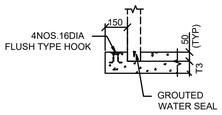
DETAILS OF BASE SLAB



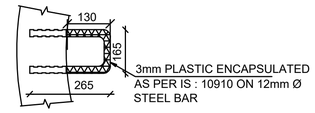
2 SECTION S1-S1
SCALE:NTS



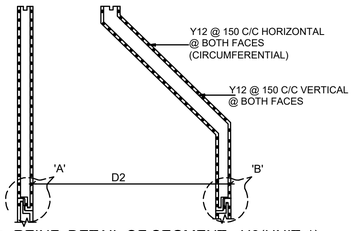
4 DETAIL OF SEGMENT - H2(UNIT-2)
SCALE : NTS



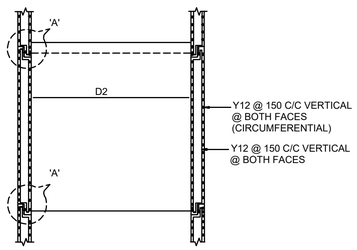
DETAIL OF 'U'



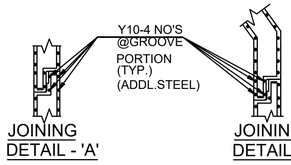
TYPICAL PLASTIC ENCAPSULATED FOOT REST DETAILS



5 REINF. DETAIL OF SEGMENT - H3(UNIT-1)
SCALE : NTS

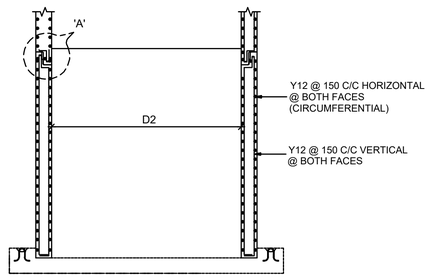


6 REINF. DETAIL OF SEGMENT - H2(UNIT-2)
SCALE : NTS

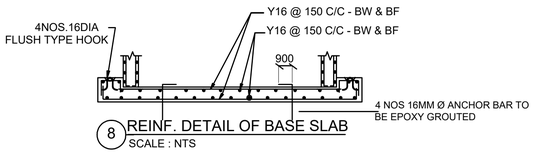


JOINING DETAIL - 'A'

JOINING DETAIL - 'B'



7 REINF. DETAIL OF SEGMENT - H1(UNIT-3)
SCALE : NTS



8 REINF. DETAIL OF BASE SLAB
SCALE : NTS

STANDARD DATA FOR PRECAST MACHINE HOLE								
1	**BASE SECTION**							PROVISION
a)	SIZE(DIAMETER) IN mm							1800
b)	DIA WISE DIMENSIONS							
	INNER DIA.OF BASE(D2) (mm)	WALL THK.(T1) (mm)	WALL THK.(T2) (mm)	JOINT DEPTH (mm)	BASE THK.(T3) (mm)	OUTER DIA.OF BASE(D1) (mm)	HEIGHT	
	1800	275	275	50	350	2650	UPTO 10m	
c)	AVAILABLE HEIGHT FOR BASE IN MM(H1)							300 TO 700 OR AS REQUIRED
d)	HOLES FOR SEWER CONNECTIONS							100mmØ MORE THAN OUTER Ø OF SEWER
e)	A)MAT CONCRETE THICKNESS IN MM & MIX							100mmTHICK,1:2:4 MIX
	B)CONCRETE MIX FOR WALL AND BASE							RCC M30 GRADE
f)	CONCRETE FILL FOR BENCHING							1:2:4, MIX WITH 1:6 SLOPE
g)	REINFORCEMENT							
	a)FOR BASE SLAB							AS PER RC DETAIL
	b)FOR WALL							AS PER RC DETAIL
2	**RISER SECTION**							
a)	AVAILABLE HEIGHT FOR RISER SECTION (H2)							300 TO 900 OR AS REQUIRED
b)	WALL THICKNESS IN MM							275mm
c)	JOINT THICKNESS AND JOINT MATERIAL							SAME AS BASE SECTION
d)	REINFORCEMENT IN THE WALL							AS PER DETAIL DRG.
3	**ECCENTRIC CONE SECTION**							
a)	SHAPE							ECCENTRIC CONE
b)	CONCRETE FILL AROUND SEWER							1:1.5:3MIX
c)	THICKNESS(T2)							275mm
d)	REINFORCEMENT							AS PER DETAIL DRG.
e)	TOP OPENING							560mm
f)	JOINT DEPTH							AS PER DETAIL DRG.
4	**STANDARD** MACHINE HOLE **FRAME AND COVER**							AS PER IS 12592-2002
a)	SHAPE							FLAT
b)	COVER SIZE							560mm
c)	SPECIFICATION							HD-20

NOTE:

1. ALL DIMENTIONS ARE IN mm AND ALL LEVELS ARE IN METER.
2. THE LIFTING HOLES SHALL BE FILLED WITH CONCRETE 1:1.5:3 MIX.
3. 3mm PVC ENCAPSULATE ON 12mm BAR, FOOT STEPS Fe 500.
4. THE NON CORE OPENING SHALL BE 100mm GREATER THAN THE OUTER DIA OF SEWER
5. SINGLE OFFSET JOINT CONFIGURATION SHALL BE ADOPTED AT THE JOINT.
6. THE JOINT SHALL BE SEALED WITH NON SHRINK GROUT/SINGLE RUBBER SEAL SHALL BE PROVIDED IN PRECAST UNITS.RUBBER GASKET SHALL BE AS PER IS 5382.
7. 150mm LIP IS OPTIONAL UNLESS OTHERWISE NOTED.
8. GRADE OF CONCRETE SHALL BE RCC M30 MIX FOR MANHOLE WALL AND FOR BASE SLAB WITH SULPHATE RESISTANCE CEMENT.
9. ALL REINFORCEMENT BARS SHALL BE HYSD CRS BARS OF GRADE Fe 500 CONFORMING TO IS:1786.
10. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE:
    a)WALL SOIL SEWAGE FACE=50mm
    b)BASE SLAB =50mm
11. THIS DRAWING IS ONLY TYPICAL CONSTRUCTION DRAWING. THE CONTRACTOR HAS TO TAKE PRIOR APPROVAL TO THE PROCESS OF MANUFACTURE OF THE PRECAST MANHOLE.
12. NET SAFE BEARING CAPACITY IS ASSUMED TO BE 10 TON/Sq.m. IF LOWER SBC ENCOUNTERED, THE BASE SLAB THICKNESS SHALL BE INCREASED AS PER DIRECTION OF ENGINEER.
13. PRE CAST FRAME AND COVER AS PER IS:12592-2002.
14. LOWEST FOOT REST SHALL NOT BE MORE THAN 300mm ABOVE BENCHING.
15. FOR MINIMUM DEPTH-MANHOLES(1.25m), WHEREVER OCCURS,THE CONICAL SECTION AND THE RISER SEGMENT (H1) MAY BE CAST AS A SINGLE UNIT BASED ON THE SITE CONDITIONS.
16. PROVISION FOR INCOMING SEWERS, HOUSE SERVICE CONNECTIONS IF ANY SHALL BE PROVIDED
17. PROVISION FOR DROP (FOR DROP ARRANGEMENT) IN MH's SHALL BE PROVIDED AS PER SITE REQUIREMENT AND AS DIRECTED
18. INCASE OF HIGHER DIAMETER PIPES, PROVISION FOR THE INCOMING AND OUTGOING SEWERS MAY BE PROVIDED IN TWO PRECAST MEMEBERS OR HEIGHT OF THE BOTTOM PRECAST MEMBERS MAY BE INCREASED
19. ADDITION REINFORCEMENT AS PER APPROVED DRAWINGS IN AND ALLROUND PIPE OPENINGS SHALL BE PROVIDED
20. INTERCONNECTION WITH INCOMING & OUTGOING SEWERS INCLUDING FIXING THEM WITH RCC M30 GRADE CONCRETE
21. THE WORK SHALL BE DONE AS PER BOQ, SPECIFICATIONS AND CONTRACT PROVISIONS.

LEGEND:

FGL	FINISHED GROUND LEVEL
RL	REDUCED LEVEL
LVL	LEVEL
THK	THICKNESS
TYP	TYPICAL
BW	BOTH WAYS
BF	BOTH FACES
RF/REINF	REINFORCEMENT
DIA	DIAMETER
NTS	NOT TO SCALE
CB	CIRCULAR BEAM
RCC	REINFORCED CEMENT CONCRETE
MAX	MAXIMUM
DI	DUCTILE IRON
ADDL	ADDITIONAL
PCC	PLAIN CEMENT CONCRETE
C/C	CENTER-TO-CENTER
HFL	HIGH FLOOD LEVEL
MIN	MINIMUM
M/S	MILD STEEL

ISSUE	DATE	DESCRIPTION	BY	CHECKED	APPD.
P0	02/04/2025	FOR TENDER PURPOSE	SGS	MKV	- -

FOR TENDER PURPOSE ONLY

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY, SOLAR PANELS ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS [WORKS - A] AND PROCUREMENT AND CONSTRUCTION OF RISING MAIN, MAIN SEWERS AND LATERALS INCLUDING MACHINE HOLES AND LIFT SEWAGE PUMPING STATIONS [WORKS - B] HYBRID MODE FOR MAHADEVAPURA ZONES IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-5)

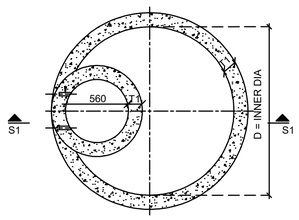
TITLE: RCC PRECAST SEWER MACHINE HOLE DETAILS 1800mm DIA (TYPICAL) FOR DEPTH UPTO 10.0M

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

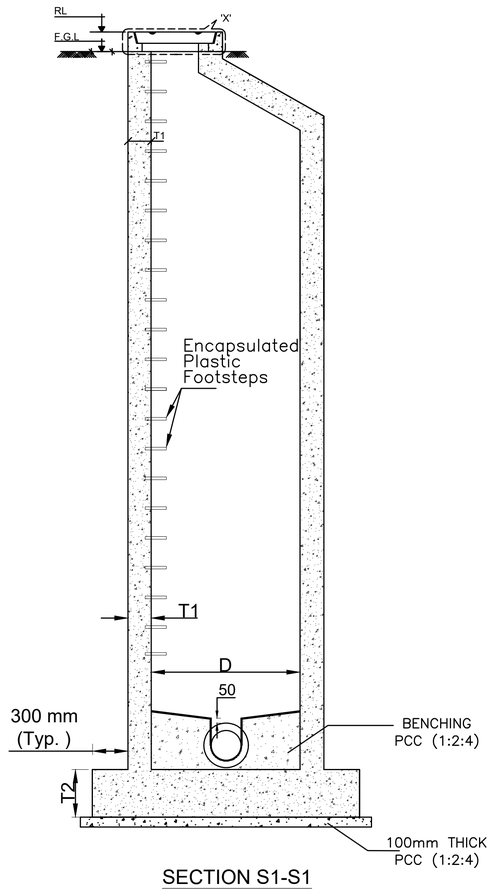
DESIGNED: MKV	APPROVED	DATE: (TO ISSUE) 02/04/2025
DRAWN: SGS		DATE: (CURRENT ISSUE) 02/04/2025
CHECKED: BMS		DIVISION: CV
SCALE: NTS	DWG. NO. TN-KWSDRP-WBS5-CV-3032	ISSUE: P0
FILE NAME: TN-KWSDRP-WBS5-CV-3032.dwg		A1 SIZE

TITLE: STANDARD DETAILS OF R.C.C CAST IN-SITU MACHINE HOLE 1200MM,1500MM,1800MM DIA UPTO 3.0M 1500MM,1800MM DIA UPTO 6M DEPTH (TYPICAL)

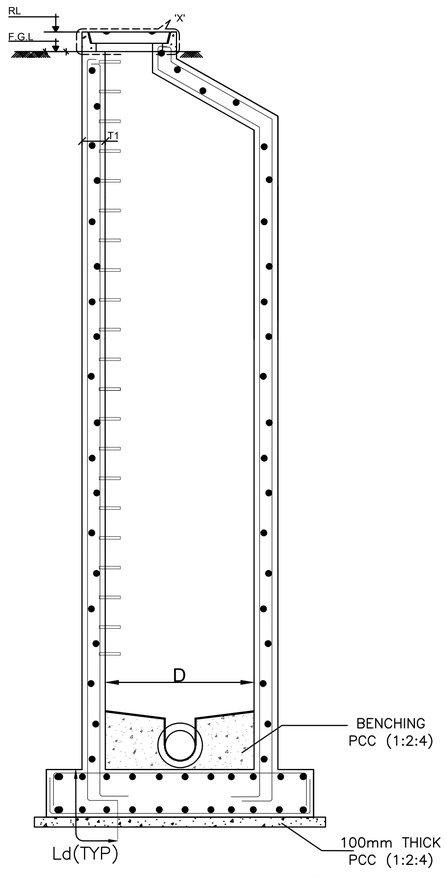
DWG NO: TN-KWSDRP-WBS5-CV-3033



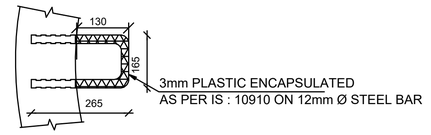
1 PLAN AT MACHINE HOLE TOP LVL
SCALE : NTS



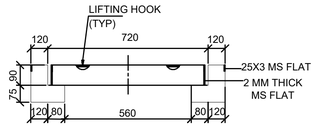
SECTION S1-S1
SECTIONAL DETAILS OF MACHINE HOLE



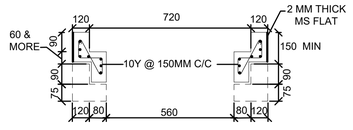
RC DETAILS OF MACHINE HOLE



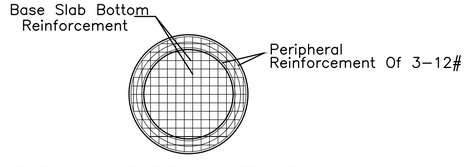
TYPICAL PLASTIC ENCAPSULATED
FOOT REST DETAILS



DETAIL OF 'X'
HD-20 MACHINE HOLE COVER



ADDITIONAL MACHINE HOLE HEIGHT
TO MATCH FINISHED ROAD LEVEL



BASE SLAB-SECTIONAL BOTTOM PLAN

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED.
2. NO DIMENSION SHALL BE SCALED FROM THE DRAWING.
3. ALL DRAWINGS ARE INTERRELATED AND SHALL BE READ IN CONJUNCTION WITH ONE ANOTHER.
4. GRADE OF CONCRETE MIX SHALL BE M30 CONFIRMING TO I.S 456-2000.
5. ONLY SULPHATE RESISTING CEMENT CONFIRMING TO IS:12330:1988 SHALL BE USED FOR ALL CONCRETING WORKS.
6. ALL REINFORCEMENT BARS SHALL BE HYSD CRS BARS OF GRADE Fe 500 CONFIRMING TO IS:1786.
7. ANY CHANGE IN SBC OF SOIL LESS THAN 12 TON THE DESIGN OF FOUNDATION SHALL BE REVISED AS PER ACTUAL SBC.
8. TOP OF MANHOLE COVER SHALL BE FLUSH WITH FINISHED ROAD LEVEL AND AS DIRECTED BY ENGINEER.
9. PROVISION FOR INCOMING SEWERS, HOUSE SERVICE CONNECTIONS IF ANY SHALL BE PROVIDED.
10. #, ಠ DENOTES HYSD BARS
11. 3mm PVC ENCAPSULATED 12mm BAR, FOOT STEPS IN Fe 500
12. PROVISION FOR DROP (FOR DROP ARRANGEMENT) IN MH's SHALL BE PROVIDED AS PER SITE REQUIREMENT AND AS DIRECTED
13. ADDITION REINFORCEMENT AS PER APPROVED DRAWINGS IN AND ALLROUND PIPE OPENINGS SHALL BE PROVIDED
14. INTERCONNECTION WITH INCOMING & OUTGOING SEWERS INCLUDING FIXING THEM WITH RCC M30 GRADE CONCRETE
15. THE WORK SHALL BE DONE AS PER SPECIFICATIONS.
16. DEVELOPMENT LENGTH Ld = 46D WHERE D IS DIAMETER OF BAR.

TABLE - 1
DIMENSION DETAILS OF MACHINE HOLE

SL.No	(Dia of Manhole) in 'mm'	(Wall height) in 'mm'	(Wall thickness) in 'mm'	(Base Slab thickness) in 'mm'
	D	H	T1	T2
1	1200	Upto 3000	200	200
2	1500	Upto 3000	200	200
3	1800	Upto 3000	200	200
4	1500	Upto 6000	250	300
5	1800	Upto 6000	250	300

TABLE - 2
REINFORCEMENT DETAILS OF MACHINE HOLE

SL.No	(Dia of Manhole) in 'mm'	(Wall height) in 'mm'	Base Slab Reinforcement (Bothways-Top & Bottom)	Wall Reinforcement	
				Hoop Reinforcement	Longitudinal Reinforcement
	D	H			
1	1200	Upto 3000	Y10@200c/c	Y10@200c/c	Y10@200c/c
2	1500	Upto 3000	Y10@200c/c	Y10@200c/c	Y10@200c/c
3	1800	Upto 3000	Y12@200c/c	Y12@200c/c	Y12@200c/c
4	1500	Upto 6000	Y12@150c/c	Y12@150c/c	Y12@150c/c
5	1800	Upto 6000	Y12@150c/c	Y12@150c/c	Y12@150c/c

LEGEND:

FGL	FINISHED GROUND LEVEL
RL	REDUCED LEVEL
LVL	LEVEL
THK	THICKNESS
TYP	TYPICAL
BW	BOTH WAYS
BF	BOTH FACES
RF/REINF	REINFORCEMENT
DIA	DIAMETER
NTS	NOT TO SCALE
CB	CIRCULAR BEAM
RCC	REINFORCED CEMENT CONCRETE
MAX	MAXIMUM
DI	DUCTILE IRON
ADDL	ADDITIONAL
PCC	PLAIN CEMENT CONCRETE
C/C	CENTER-TO-CENTER
HFL	HIGH FLOOD LEVEL
MIN	MINIMUM
M/S	MILD STEEL

ISSUE	DATE	DESCRIPTION	BY	CHECKED	APPD.
P0	02/04/2025	FOR TENDER PURPOSE	SGS	MKV	– –

FOR TENDER PURPOSE ONLY

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERTIARY TREATMENT FACILITY, SOLAR PANELS ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS [WORKS - A] AND PROCUREMENT AND CONSTRUCTION OF RISING MAIN, MAIN SEWERS AND LATERALS INCLUDING MACHINE HOLES AND LIFT SEWAGE PUMPING STATIONS [WORKS - B] HYBRID MODE FOR MAHADEVAPURA ZONES IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-5)

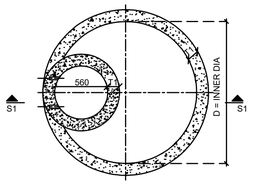
TITLE:
STANDARD DETAILS OF R.C.C CAST IN-SITU MACHINE HOLE
1200mm,1500mm,1800mm DIA UPTO 3.0m
1500mm,1800mm DIA UPTO 6m DEPTH (TYPICAL)

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

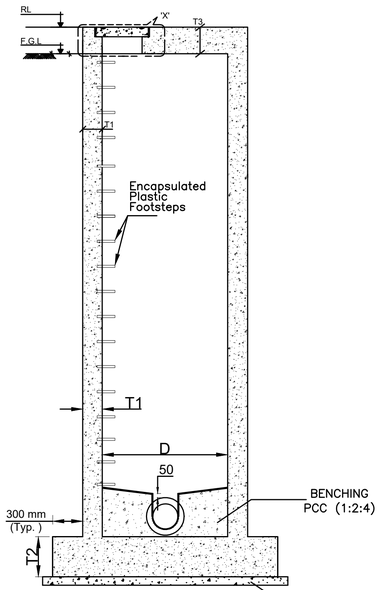
DESIGNED: MKV	APPROVED	DATE: (TO ISSUE) 02/04/2025
DRAWN: SGS		DATE:(CURRENT ISSUE) 02/04/2025
CHECKED: BMS		DIVISION: CV
SCALE: NTS	DWG. NO. TN-KWSDRP-WBS5-CV-3033	ISSUE: P0
FILE NAME: TN-KWSDRP-WBS5-CV-3033.dwg		A1 SIZE

TITLE: RCC CAST IN SITU MACHINE HOLE 1200MM, 1500MM & 1800MM DIA UPTO 3.0M 6M DEPTH (TYPICAL)

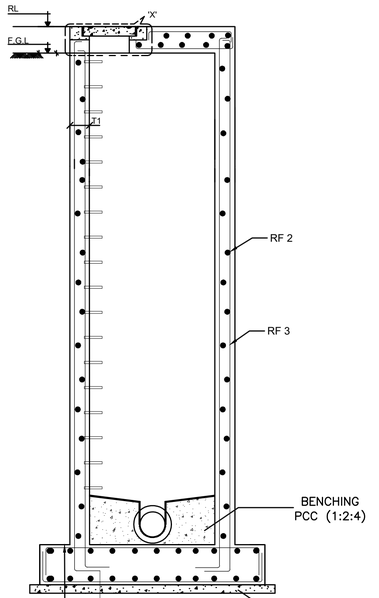
DWG NO: TN-KWSDRP-WBSS-CV-3034



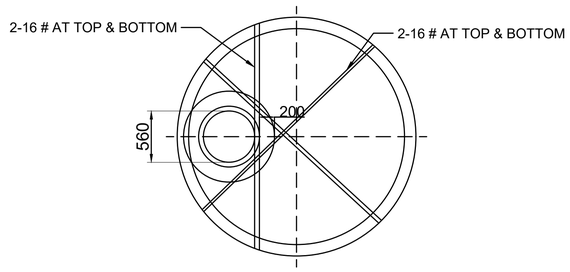
1 PLAN AT MACHINE HOLE TOP LVL
SCALE : NTS



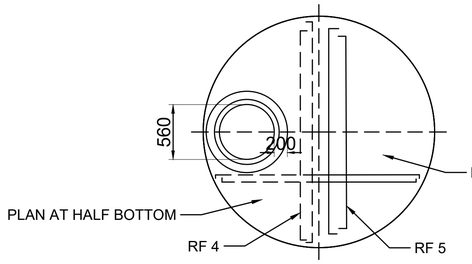
SECTION S1–S1
SECTIONAL DETAILS OF MACHINE HOLE



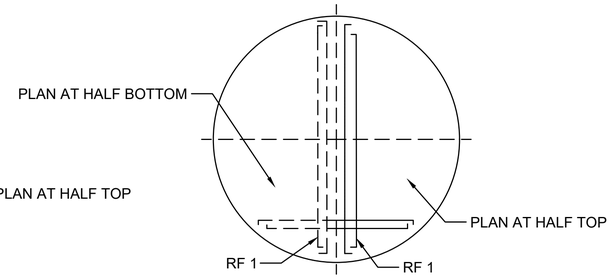
RC DETAILS OF MACHINE HOLE



ADDITIONAL REINFORCEMENT DETAIL AROUND MACHINE HOLE OPENING



MACHINE HOLE TOP SLAB



MACHINE HOLE BOTTOM RAFT SLAB

TABLE - 2

REINFORCEMENT DETAILS OF MACHINE HOLE

SL.No	(Dia of Manhole) in 'mm'	(Wall height) in 'mm'	Base Slab Reinforcement (Bothways-Top & Bottom)	Wall Reinforcement		Top Slab Reinforcement	
				Hoop Reinforcement	Longitudinal Reinforcement (Vertical)	Bothways Bottom	Bothways Top
	D	H	RF1	RF2	RF3	RF4	RF5
1	1200	Upto 3000	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y16@125c/c	Y10@125c/c
2	1500	Upto 3000	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y16@125c/c	Y10@125c/c
3	1800	Upto 3000	Y12@200c/c	Y12@200c/c	Y12@200c/c	Y16@100c/c	Y10@100c/c
4	1500	Upto 6000	Y12@150c/c	Y12@150c/c	Y12@150c/c	Y16@125c/c	Y10@125c/c
5	1800	Upto 6000	Y12@150c/c	Y12@150c/c	Y12@150c/c	Y16@100c/c	Y10@100c/c

TABLE - 1

DIMENSION DETAILS OF MACHINE HOLE

SL.No	(Dia of Manhole) in 'mm'	(Wall height) in 'mm'	(Wall thickness) in 'mm'	(Base Slab thickness) in 'mm'	Top Slab Thickness
	D	H	T1	T2	T3
1	1200	Upto 3000	200	200	300
2	1500	Upto 3000	200	200	300
3	1800	Upto 3000	200	200	300
4	1500	Upto 6000	300	300	300
5	1800	Upto 6000	300	300	300

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED.
2. NO DIMENSION SHALL BE SCALED FROM THE DRAWING.
3. ALL DRAWINGS ARE INTERRELATED AND SHALL BE READ IN CONJUNCTION WITH ONE ANOTHER.
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6. ALL REINFORCEMENT BARS SHALL BE HYSD CRS BARS OF GRADE Fe 500 CONFIRMING TO IS:1786.
7. ANY CHANGE IN SBC OF SOIL LESS THAN 12 TON THE DESIGN OF FOUNDATION SHALL BE REVISED AS PER ACTUAL SBC.
8. TOP OF MANHOLE COVER SHALL BE FLUSH WITH FINISHED ROAD LEVEL AND AS DIRECTED BY ENGINEER.
9. PROVISION FOR INCOMING SEWERS, HOUSE SERVICE CONNECTIONS IF ANY SHALL BE PROVIDED.
10. #, DENOTES HYSD BARS
11. 3mm PVC ENCAPSULATED 12mm BAR, FOOT STEPS IN Fe 500
12. PROVISION FOR DROP (FOR DROP ARRANGEMENT) IN MH's SHALL BE PROVIDED AS PER SITE REQUIREMENT AND AS DIRECTED
13. ADDITION REINFORCEMENT AS PER APPROVED DRAWINGS IN AND ALLROUND PIPE OPENINGS SHALL BE PROVIDED
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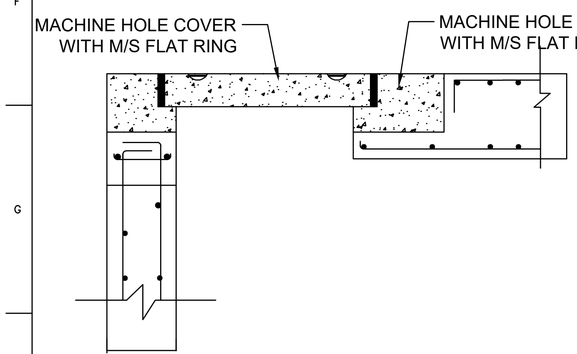
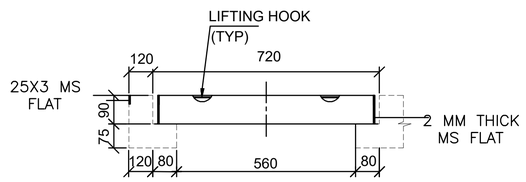
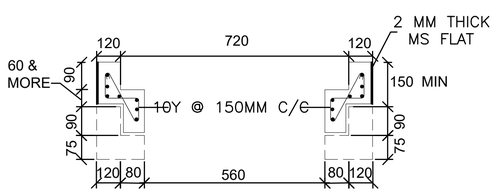
15. THE WORK SHALL BE DONE AS PER SPECIFICATIONS.
16. DEVELOPMENT LENGTH Ld = 46D WHERE D IS DIAMETER OF BAR.



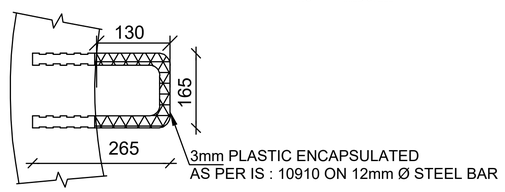
RCC MACHINE HOLE COVER AND FRAME



DETAIL OF 'X'
HD-20 MACHINE HOLE COVER



ADDITIONAL MACHINE HOLE HEIGHT TO MATCH FINISHED ROAD LEVEL



TYPICAL PLASTIC ENCAPSULATED FOOT REST DETAILS

LEGEND:

FGL	FINISHED GROUND LEVEL
RL	REDUCED LEVEL
LVL	LEVEL
THK	THICKNESS
TYP	TYPICAL
BW	BOTH WAYS
BF	BOTH FACES
RF/REINF	REINFORCEMENT
DIA	DIAMETER
NTS	NOT TO SCALE
CB	CIRCULAR BEAM
RCC	REINFORCED CEMENT CONCRETE
MAX	MAXIMUM
DI	DUCTILE IRON
ADDL	ADDITIONAL
PCC	PLAIN CEMENT CONCRETE
C/C	CENTER-TO-CENTER
HFL	HIGH FLOOD LEVEL
MIN	MINIMUM
M/S	MILD STEEL

ISSUE	DATE	DESCRIPTION	BY	CIVIL	-	-	APPD.
P0	02/04/2025	FOR TENDER PURPOSE	SGS	MKV	–	–	
				CHECKED			

FOR TENDER PURPOSE ONLY

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

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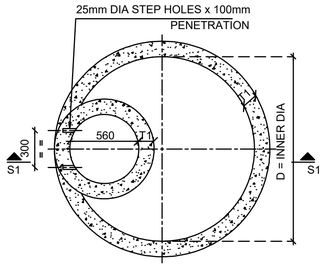
TITLE: RCC CAST IN SITU MACHINE HOLE 1200MM, 1500MM & 1800MM DIA UPTO 3.0M 6M DEPTH (TYPICAL)

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

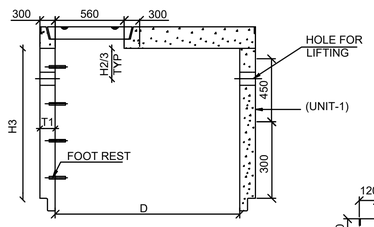
DESIGNED: MKV	APPROVED	DATE: (TO ISSUE) 02/04/2025
DRAWN: SGS		DATE:(CURRENT ISSUE) 02/04/2025
CHECKED: BMS		DIVISION: CV
SCALE: NTS	DWG. NO. TN-KWSDRP-WBS5-CV-3034	ISSUE: P0
FILE NAME: TN–KWSDRP–WBS5–CV–3034.dwg		A1 SIZE

TITLE: RCC PRECAST SEWER MACHINE HOLE DETAILS FOR 1200, 1500 & 1800 DIA (VERTICAL WALL)

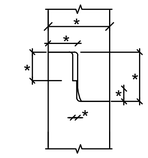
DWG NO: TN-KWSDRP-WBS5-CV-3035



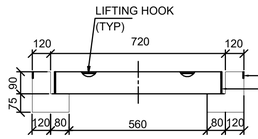
1 PLAN AT MACHINE HOLE TOP LVL
SCALE : NTS



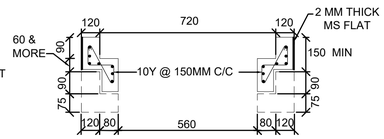
3 DETAIL OF SEGMENT - H3(UNIT-1)
SCALE : NTS



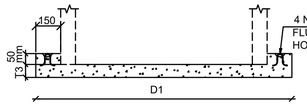
DETAILS OF 'Z'
TYP.JOINING DETAILS OF PRECAST SEGMENT (REFER PRECAST DRAWINGS 1002 TO 1012 FOR DETAILS)



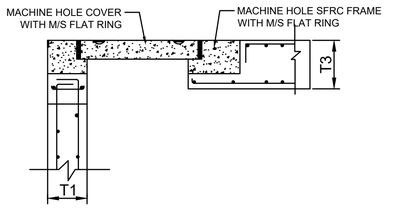
DETAIL OF 'X'
HD-20 MACHINE HOLE COVER



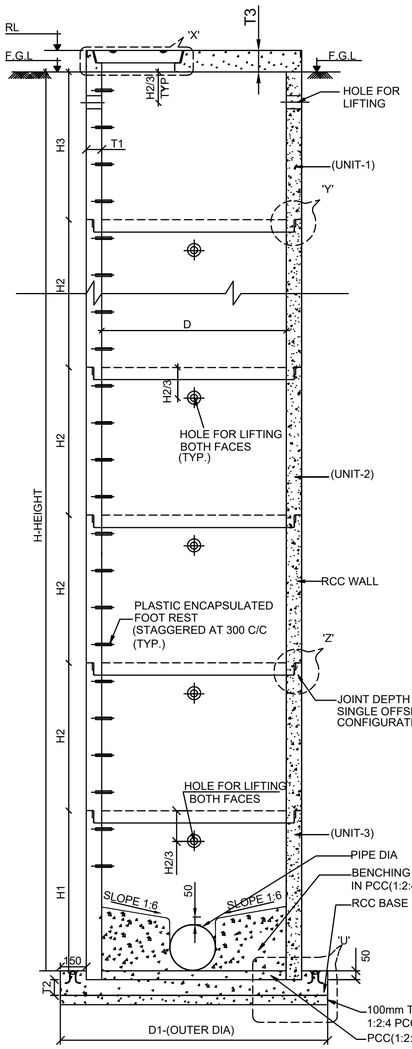
ADDITIONAL MACHINE HOLE HEIGHT TO MATCH FINISHED ROAD LEVEL



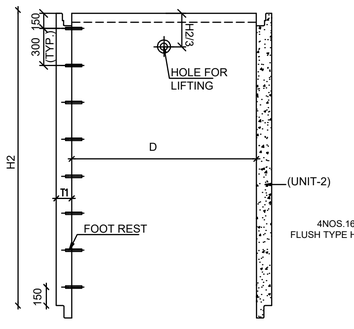
DETAILS OF BASE SLAB



RCC MACHINE HOLE COVER AND FRAME



2 SECTION S1-S1
SCALE:NTS



4 DETAIL OF SEGMENT - H2(UNIT-2)
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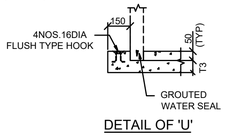
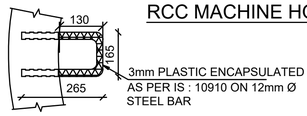
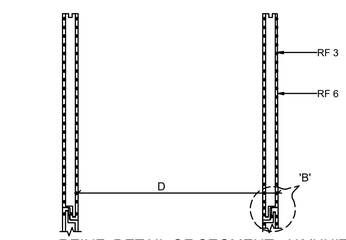


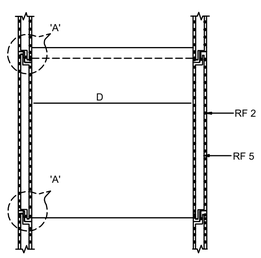
DETAIL OF 'U'



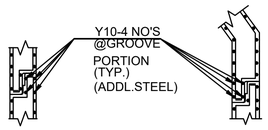
TYPICAL PLASTIC ENCAPSULATED FOOT REST DETAILS



5 REINF. DETAIL OF SEGMENT - H3(UNIT-1)
SCALE : NTS

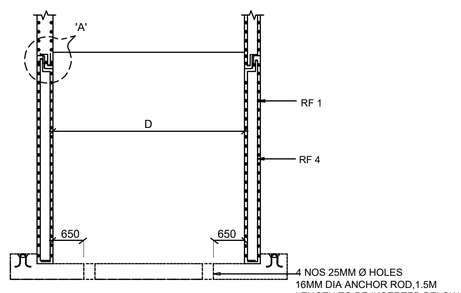


6 REINF. DETAIL OF SEGMENT - H2(UNIT-2)
SCALE : NTS



JOINING DETAIL - 'A'

JOINING DETAIL - 'B'



7 REINF. DETAIL OF SEGMENT - H1(UNIT-3)
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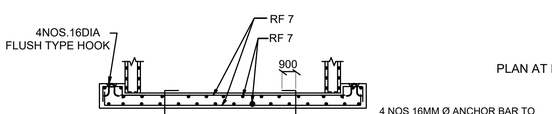
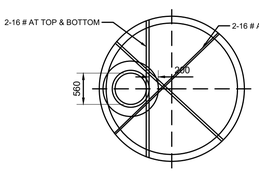
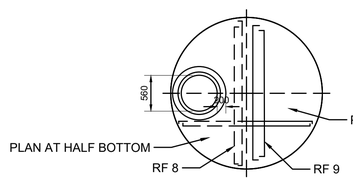


8 REINF. DETAIL OF BASE SLAB
SCALE : NTS



ADDITIONAL REINFORCEMENT DETAIL AROUND MACHINE HOLE OPENING



MACHINE HOLE TOP SLAB

DIMENSION DETAILS OF MACHINE HOLE

SL.No	(Dia of Manhole) in 'mm'	(Wall height) in 'mm'	(Wall thickness) in 'mm'	Joint Depth	Base Slab thickness in 'mm'	Over Dia	TOP Slab thickness in 'mm'
	D	H1	T1		T2	D1	T3
1	1200	Upto 3000	200	50	200	1900	300
2	1500	Upto 3000	200	50	250	2200	300
3	1500	Upto 7000	250	50	300	2300	300
4	1800	Upto 3000	200	50	300	2500	300
5	1800	Upto 6000	250	50	300	2600	300
6	1800	Upto 8000	250	50	350	2600	300
7	1800	Upto 10000	275	50	350	2650	300

STANDARD DATA FOR PRECAST MACHINE HOLE		
1	**DETAILS OF MANHOLE**	PROVISION
a)	AVAILABLE HEIGHT FOR BASE IN MM(H1)	300 TO 700 OR AS REQUIRED
b)	HOLES FOR SEWER CONNECTIONS	100mmØ MORE THAN OUTER Ø OF SEWER
c)	A)MAT CONCRETE THICKNESS IN MM & MIX	100mmTHICK,1:2:4 MIX
	B)CONCRETE MIX FOR WALL AND BASE	RCC M30 GRADE
d)	CONCRETE FILL FOR BENCHING	1:2:4, MIX WITH 1:6 SLOPE
e)	REINFORCEMENT	
	a)FOR BASE SLAB	AS PER RC DETAIL
	b)FOR WALL	AS PER RC DETAIL
2	**RISER SECTION**	
a)	AVAILABLE HEIGHT FOR RISER SECTION (H2)	300 TO 900 OR AS REQUIRED
b)	WALL THICKNESS IN MM	200mm
c)	JOINT THICKNESS AND JOINT MATERIAL	SAME AS BASE SECTION
d)	REINFORCEMENT IN THE WALL	AS PER DETAIL DRG.
3	**STANDARD MANHOLE FRAME AND COVER**	AS PER IS 12592-2002
a)	SHAPE	FLAT
b)	COVER SIZE	560mm
c)	SPECIFICATION	HD-20

NOTE:

1. ALL DIMENTIONS ARE IN mm AND ALL LEVELS ARE IN METER.
2. THE LIFTING HOLES SHALL BE FILLED WITH CONCRETE 1:1.5:3 MIX.
3. 3mm PVC ENCAPSULATE ON 12mm BAR, FOOT STEPS Fe 500.
4. THE NON CORE OPENING SHALL BE 100mm GREATER THAN THE OUTER DIA OF SEWER.
5. SINGLE OFFSET JOINT CONFIGURATION SHALL BE ADOPTED AT THE JOINT.
6. THE JOINT SHALL BE SEALED WITH NON SHRINK GROUT/SINGLE RUBBER SEAL SHALL BE PROVIDED IN PRECAST UNITS.RUBBER GASKET SHALL BE AS PER IS 5382.
7. 150mm LIP IS OPTIONAL UNLESS OTHERWISE NOTED.
8. GRADE OF CONCRETE SHALL BE RCC M30 MIX FOR MANHOLE WALL AND FOR BASE SLAB WITH SULPHATE RESISTANCE CEMENT.
9. ALL REINFORCEMENT BARS SHALL BE HYSD CRS BARS OF GRADE Fe 500 CONFORMING TO IS:1786.
10. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE:
    a)WALL SOIL SEWAGE FACE=50mm
    b)BASE SLAB =50mm
11. THIS DRAWING IS ONLY TYPICAL CONSTRUCTION DRAWING. THE CONTRACTOR HAS TO TAKE PRIOR APPROVAL TO THE PROCESS OF MANUFACTURE OF THE PRECAST MANHOLE.
12. NET SAFE BEARING CAPACITY IS ASSUMED TO BE 10 TON/Sq.m. IF LOWER SBC ENCOUNTERED, THE BASE SLAB THICKNESS SHALL BE INCREASED AS PER DIRECTION OF ENGINEER.
13. PRE CAST FRAME AND COVER AS PER IS:12592-2002.
14. LOWEST FOOT REST SHALL NOT BE MORE THAN 300mm ABOVE BENCHING.
15. FOR MINIMUM DEPTH-MANHOLES(1.25m), WHEREVER OCCURS,THE CONICAL SECTION AND THE RISER SEGMENT (H1) MAY BE CAST AS A SINGLE UNIT BASED ON THE SITE CONDITIONS.
16. PROVISION FOR INCOMING SEWERS, HOUSE SERVICE CONNECTIONS IF ANY SHALL BE PROVIDED
17. PROVISION FOR DROP (FOR DROP ARRANGEMENT) IN MH's SHALL BE PROVIDED AS PER SITE REQUIREMENT AND AS DIRECTED
18. INCASE OF HIGHER DIAMETER PIPES, PROVISION FOR THE INCOMING AND OUTGOING SEWERS MAY BE PROVIDED IN TWO PRECAST MEMEBERS OR HEIGHT OF THE BOTTOM PRECAST MEMBERS MAY BE INCREASED
19. ADDITION REINFORCEMENT AS PER APPROVED DRAWINGS IN AND ALLROUND PIPE OPENINGS SHALL BE PROVIDED
20. INTERCONNECTION WITH INCOMING & OUTGOING SEWERS INCLUDING FIXING THEM WITH RCC M30 GRADE CONCRETE
21. THE WORK SHALL BE DONE AS PER BOQ, SPECIFICATIONS AND CONTRACT PROVISIONS.
22. *REFER RELEVANT PRECAST SECTION FROM DRAWING No. 1002 TO 1012 FOR SECTIONAL DETAILS.

LEGEND:

FGL	FINISHED GROUND LEVEL	NTS	NOT TO SCALE
RL	REDUCED LEVEL	CB	CIRCULAR BEAM
LVL	LEVEL	RCC	REINFORCED CEMENT CONCRETE
THK	THICKNESS	MAX	MAXIMUM
TYP	TYPICAL	DI	DUCTILE IRON
BW	BOTH WAYS	ADDL	ADDITIONAL
BF	BOTH FACES	PCC	PLAIN CEMENT CONCRETE
RF/REINF	REINFORCEMENT	C/C	CENTER-TO-CENTER
DIA	DIAMETER	HFL	HIGH FLOOD LEVEL
		MIN	MINIMUM
		M/S	MILD STEEL

REINFORCEMENT DETAILS OF MACHINE HOLE

SL.No	(Dia of Manhole) in 'mm'	(Wall height) in 'mm'	HOOP			VERTICAL R/F				Top Slab Reinforcement	
			H1	H2	H3	H1	H2	H3	Base Slab Reinforcement (Bothways-Top & Bottom)	Bothways Bottom	Bothways Top
	D	H	RF1	RF2	RF3	RF4	RF5	RF6	RF7	RF8	RF9
1	1200	Upto 3000	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y16@125c/c	Y16@125c/c
2	1500	Upto 3000	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y16@125c/c	Y16@125c/c
3	1500	Upto 7000	Y10@150c/c	Y10@150c/c	Y10@150c/c	Y10@150c/c	Y10@150c/c	Y10@150c/c	Y12@200c/c	Y16@125c/c	Y16@125c/c
4	1800	Upto 3000	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y12@200c/c	Y16@100c/c	Y10@100c/c
5	1800	Upto 6000	Y10@150c/c	Y10@150c/c	Y10@150c/c	Y10@150c/c	Y10@150c/c	Y10@150c/c	Y12@200c/c	Y16@100c/c	Y10@100c/c
6	1800	Upto 8000	Y12@200c/c	Y12@200c/c	Y12@200c/c	Y12@200c/c	Y12@200c/c	Y12@200c/c	Y16@200c/c	Y16@100c/c	Y10@100c/c
7	1800	Upto 10000	Y12@150c/c	Y12@150c/c	Y12@150c/c	Y12@150c/c	Y12@150c/c	Y12@150c/c	Y16@150c/c	Y16@100c/c	Y10@100c/c

ISSUE	DATE	DESCRIPTION	BY	CHECKED	APPD.
P0	02/04/2025	FOR TENDER PURPOSE	SGS	MKV	- -

FOR TENDER PURPOSE ONLY

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

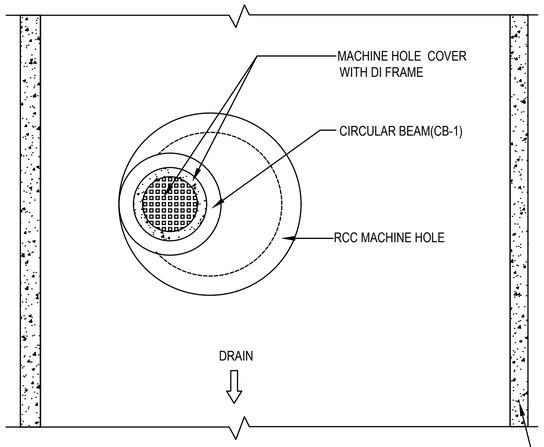
DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY, SOLAR PANELS ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS [WORKS - A] AND PROCUREMENT AND CONSTRUCTION OF RISING MAIN, MAIN SEWERS AND LATERALS INCLUDING MACHINE HOLES AND LIFT SEWAGE PUMPING STATIONS [WORKS - B] HYBRID MODE FOR MAHADEVAPURA ZONES IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-5)

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

DESIGNED: MKV	APPROVED	DATE: (TO ISSUE) 02/04/2025
DRAWN: SGS		DATE: (CURRENT ISSUE) 02/04/2025
CHECKED: BMS		DIVISION: CV
SCALE: NTS	DWG. NO. TN-KWSDRP-WBS5-CV-3035	ISSUE: P0
FILE NAME: TN-KWSDRP-WBS5-CV-3035.dwg		A1 SIZE

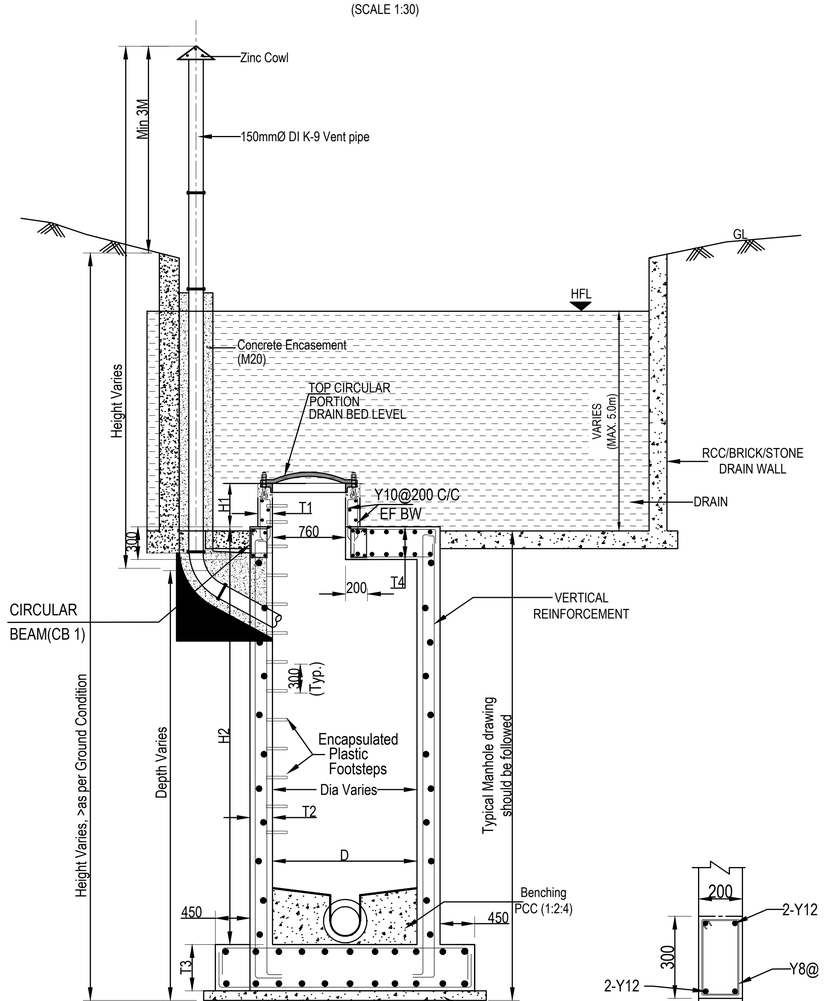
TITLE: STANDARD DETAILS OF R.C.C CAST IN-SITU MACHINE HOLE 1200MM,1500MM,1800MMDIA UPTO 3M DEPTH 1500MM,1800MMUPTO 6M DEPTH (TYPICAL) WITH VENTILATION SHAFT

DWG NO: TN-KWSDRP-WBS5-CV-3036



PLAN OF MAN HOLE INSIDE THE DRAIN (RCC)

(SCALE 1:30)



SECTIONAL DETAILS OF MANHOLE INSIDE THE DRAIN (RCC)

(SCALE 1:30)

VALID FOR 3 TO 6M BELOW DRAIN

TABLE - 1

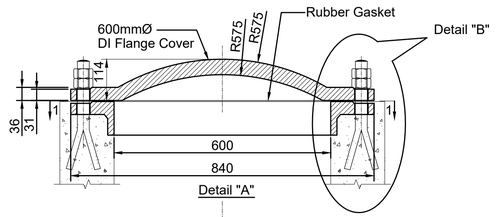
DIMENSION DETAILS OF MACHINE HOLE

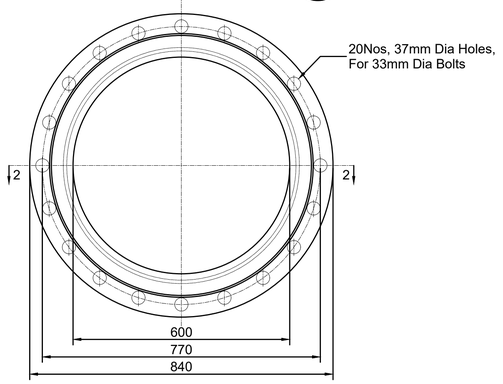
SL.No	(DIA OF MACHINE HOLE) in 'mm'	(Wall height) in 'mm'	(Wall thickness in 'mm'	(Wall thickness) in 'mm'	(Base Slab thickness) in 'mm'	(Roof Slab thickness) in 'mm'
	D	H2	T1	T2	T3	T4
1	1200	upto 3000	150	200	200	300
2	1500					
3	1800					
5	1500	3000 to 6000	150	300	300	300
6	1800					

TABLE - 2

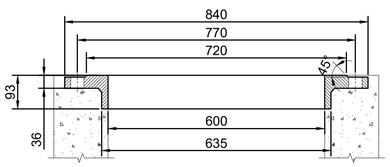
REINFORCEMENT DETAILS OF MACHINE HOLE

SL.No	(DIA OF MACHINE HOLE) in 'mm'	(Wall height) in 'mm'	Base Slab Reinforcement (a)	Wall Reinforcement			Roof Slab Reinforcement (a)
				Hoop Reinforcement (c)		Longitudinal Reinforcement (b)	
				upto half the height (h) from the bottom	Top half the height (h)		
	D	H2					
1	1200	upto 3000	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y10@200c/c
2	1500		Y10@200c/c	Y10@200c/c	Y10@200c/c	Y10@200c/c	Y10@200c/c
3	1800		Y12@200 c/c	Y12@200 c/c	Y12@200 c/c	Y12@200c/c	Y12@200 c/c
4	1500	3000 to 6000	Y12@150c/c	Y12@150c/c	Y12@150c/c	Y12@150c/c	T12@150c/c
5	1800		Y12@150c/c	Y12@150c/c	Y12@150c/c	Y12@150c/c	Y12@125c/c



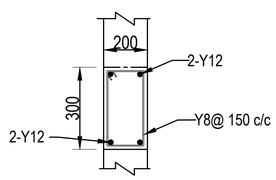


Section 1-1

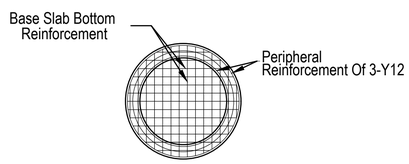


Section 2-2

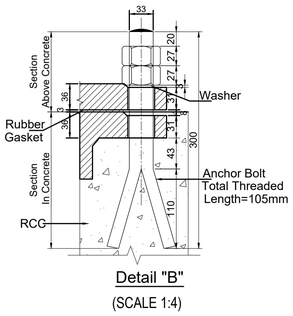
(SCALE 1:5)



CIRCULAR BEAM (CB 1)

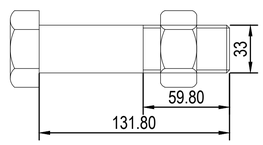


BASE SLAB-SECTIONAL BOTTOM PLAN



Detail "B"

(SCALE 1:4)



Bolt Details

(SCALE 1:2)

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED.
2. NO DIMENSION SHALL BE SCALED FROM THE DRAWING.
3. ALL DRAWINGS ARE INTERRELATED AND SHALL BE READ IN CONJUNCTION WITH ONE ANOTHER.
4. GRADE OF CONCRETE MIX SHALL BE M30 CONFIRMING TO I.S 456–2000.
5. ONLY SULPHATE RESISTING CEMENT CONFIRMING TO IS:12330:1988 SHALL BE USED FOR ALL CONCRETING WORKS.
6. ALL REINFORCEMENT BARS SHALL BE HYSD CRS BARS OF GRADE Fe 500 CONFIRMING TO IS:1786.
7. ANY CHANGE IN SBC OF SOIL LESS THAN 12 TON THE DESIGN OF FOUNDATION SHALL BE REVISED AS PER ACTUAL SBC.
8. TOP OF MACHINE HOLE COVER SHALL BE FLUSH WITH FINISHED ROAD LEVEL AND AS DIRECTED BY ENGINEER.
9. IF THE SEWER ROUTE IS PARALLEL TO NALLA/DRAIN/LAKE THEN THE TOP OF MACHINE HOLES SHOULD BE ATLEAST 0.2 m ABOVE THE HFL OF THE NALLA/DRAIN/LAKE OR AS DIRECTED BY THE ENGINEER.
10. WHEREVER THE SEWER ROUTE IS INSIDE THE NALLA, DRAIN BED LEVEL SHALL BE TAKEN FOR THE DESIGN AND THE DEPTH OF MH SHALL BE AS DIRECTED BY THE ENGINEER.
11. H1 IS 1500MM FOR MACHINE HOLE HEIGHT UP TO 3000 MM AND 3000 MM FOR MACHINE HOLE HEIGHT FROM 3000 MM TO 10000 MM OR AS PER SITE CONDTION.
12. PROVISION FOR INCOMING SEWERS, HOUSE SERVICE CONNECTIONS IF ANY SHALL BE PROVIDED.
13. Y DENOTES HYSD BARS
14. 3mm PVC ENCAPSULATE ON 12mm BAR, FOOT STEPS Fe 500
15. PROVISION FOR DROP (FOR DROP ARRANGEMENT) IN MH's SHALL BE PROVIDED AS PER SITE REQUIREMENT AND AS DIRECTED
16. IN CASE OF MACHINE HOLES IN DRAIN/NALLAH, FIXING OF THE TOP OF THE COVER SHALL BE WITH REINFORCEMENT RODS ANCHORD WITH HOOKS ON THE WALLS FOR PROTECTING AGAINST UPLIFT/LIFTING OF THE COVER
17. ADDITIONAL REINFORCEMENT AS PER APPROVED DRAWINGS IN AND ALLROUND PIPE OPENINGS SHALL BE PROVIDED
18. INTERCONNECTION WITH INCOMING & OUTGOING SEWERS INCLUDING FIXING THEM WITH RCC M30 GRADE CONCRETE
19. IN CASE OF CAST IN–SITU MACHINE HOLE TO BE CONSTRUCTED IN ROAD, MACHINE HOLE SHALL BE CONSTRUCTED WITHOUT TOP CIRCULAR PORTION.
20. THE WORK SHALL BE DONE AS PER BOQ, SPECIFICATIONS AND CONTRACT PROVISIONS.
21. GAP TO MATCH FORMWORK AT SITE (50–75mm).
22. VENTILATING SHAFT WILL BE PROVIDED AS PER SITE CONDITION & AS DIRECTED BY ENGINEER.
23. VERTICAL SHAFT CAN BE INSIDE/OUTSIDE THE SWD DEPENDS ON SITE CONDITION & UPON APPROVAL OF ENGINEER.

LEGEND:

FGL	FINISHED GROUND LEVEL
RL	REDUCED LEVEL
LVL	LEVEL
THK	THICKNESS
TYP	TYPICAL
BW	BOTH WAYS
BF	BOTH FACES
RF/REINF	REINFORCEMENT
DIA	DIAMETER
NTS	NOT TO SCALE
CB	CIRCULAR BEAM
RCC	REINFORCED CEMENT CONCRETE
MAX	MAXIMUM
DI	DUCTILE IRON
ADDL	ADDITIONAL
PCC	PLAIN CEMENT CONCRETE
C/C	CENTER-TO-CENTER
HFL	HIGH FLOOD LEVEL
MIN	MINIMUM
M/S	MILD STEEL

ISSUE	DATE	DESCRIPTION	BY	CHECKED	APPD.
P0	02/04/2025	FOR TENDER PURPOSE	SGS	MKV	-

FOR TENDER PURPOSE ONLY

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY, SOLAR PANELS ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS [WORKS - A] AND PROCUREMENT AND CONSTRUCTION OF RISING MAIN, MAIN SEWERS AND LATERALS INCLUDING MACHINE HOLES AND LIFT SEWAGE PUMPING STATIONS [WORKS - B] HYBRID MODE FOR MAHADEVAPURA ZONES IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-5)

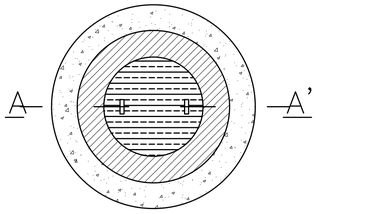
TITLE: STANDARD DETAILS OF R.C.C CAST IN-SITU MACHINE HOLE 1200mm,1500mm,1800mmDIA UPTO 3m DEPTH 1500mm,1800mmUPTO 6m DEPTH (TYPICAL) WITH VENTILATION SHAFT

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

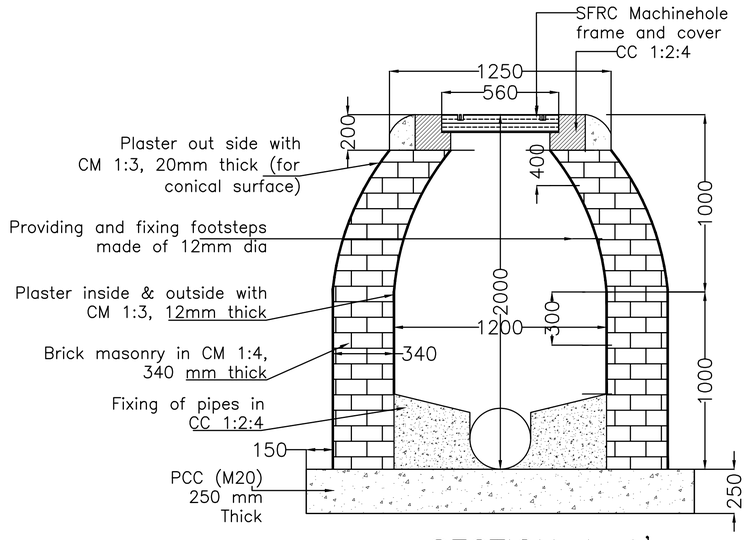
DESIGNED: MKV	APPROVED	DATE: (TO ISSUE) 02/04/2025
DRAWN: SGS		DATE: (CURRENT ISSUE) 02/04/2025
CHECKED: BMS		DIVISION: CV
SCALE: NTS	DWG. NO. TN-KWSDRP-WBS5-CV-3036	ISSUE: P0
FILE NAME: TN-KWSDRP-WBS5-CV-3036.dwg		A1 SIZE

TITLE: PLAN & SECTION OF BRICK MASONRY MACHINE HOLE FOR 1.2 M DIA, 2M & 6M DEPTH

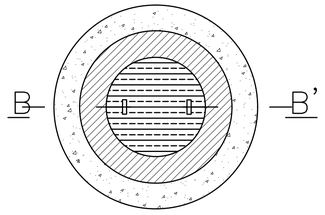
DWG NO: TN-KWSDRP-WBS5-CV-3037



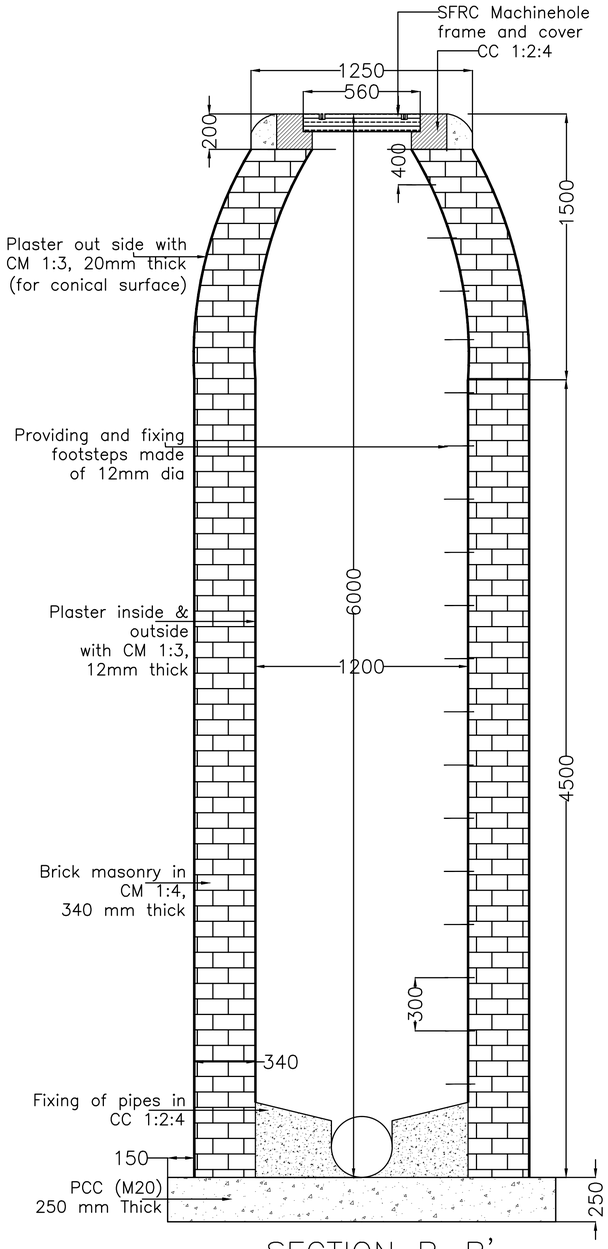
PLAN



SECTION A–A'



PLAN



SECTION B–B'

NOTES:

1. All levels are in MM, Unless Other Wise Mentioned.
2. All Levels Are With Reference To The Gts Bench Mark Engraved On Centre Of 2nd Stones On East Side Of Queen Victoria's Statue In Cubbon Park, Bangalore. Its Value Is 912.266m.
3. All the Co–ordinates are based on UTM WGS–84.

DRAWING / DOCUMENT REVIEW STATUS

Date of Receipt .....

A. Approved, manufacture / construction may commence.
B. Acceptable subject to changes indicated, resubmit for approval but manufacture/ construction may commence.
C. Amend as per the comments indicated and resubmit for approval.
D. Comments noted in letter/memo attached to forwarding transmittal Nr..... dated ..... Amend as comments indicated resubmit for approval.
E. Amend as comments indicated resubmit for record.
F. Comments noted in letter/memo attached to forwarding transmittal Nr. ..... dated..... Amend as comments indicated resubmit for record.
G. Drawing of this category is for information and hence not required to be approved.
H. Returned without review.

Approval of drawings / documents does not absolve Contractor / Vendor from any responsibilities for their accuracy or for the design, performance and safety of the Plant / Works or any other obligations under the contract and Indian Statutory Laws nor does it limit the Employer?s right under the contract.

LEGEND:

CM	CEMENT MOTAR
SFRC	STEEL FIBER REINFORCED CONCRETE
CC	CEMENT CONCRETE
PCC	PLAIN CEMENT CONCRETE

ISSUE	DATE	DESCRIPTION	BY	CHECKED	APPD.
P0	02/04/2025	FOR TENDER PURPOSE	SGS	MKV	– –

FOR TENDER PURPOSE ONLY

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

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TITLE: PLAN & SECTION OF BRICK MASONRY MACHINE HOLE FOR 1.2 m DIA, 2m & 6m DEPTH

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

DESIGNED: MKV	APPROVED	DATE: (TO ISSUE) 02/04/2025
DRAWN: SGS		DATE:(CURRENT ISSUE) 02/04/2025
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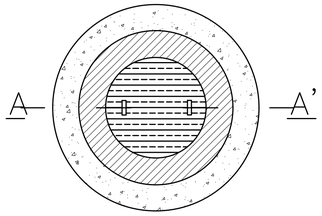
SCALE: NTS	DWG. NO. TN-KWSDRP-WBS5-CV-3037	ISSUE: P0

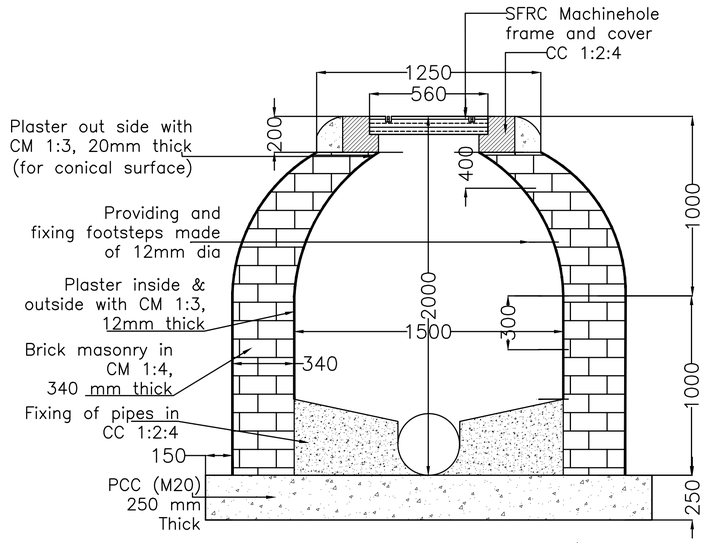
FILE NAME: TN–KWSDRP–WBS5–CV–3037.dwg — A1 SIZE

TITLE: PLAN & SECTION OF BRICK MASONRY MACHINE HOLE FOR 1.5 M DIA, 2M & 6M DEPTH

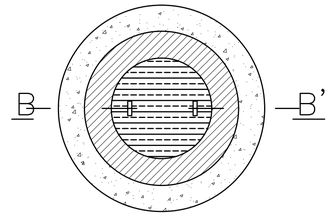
DWG NO: TN-KWSDRP-WBSS-CV-3038



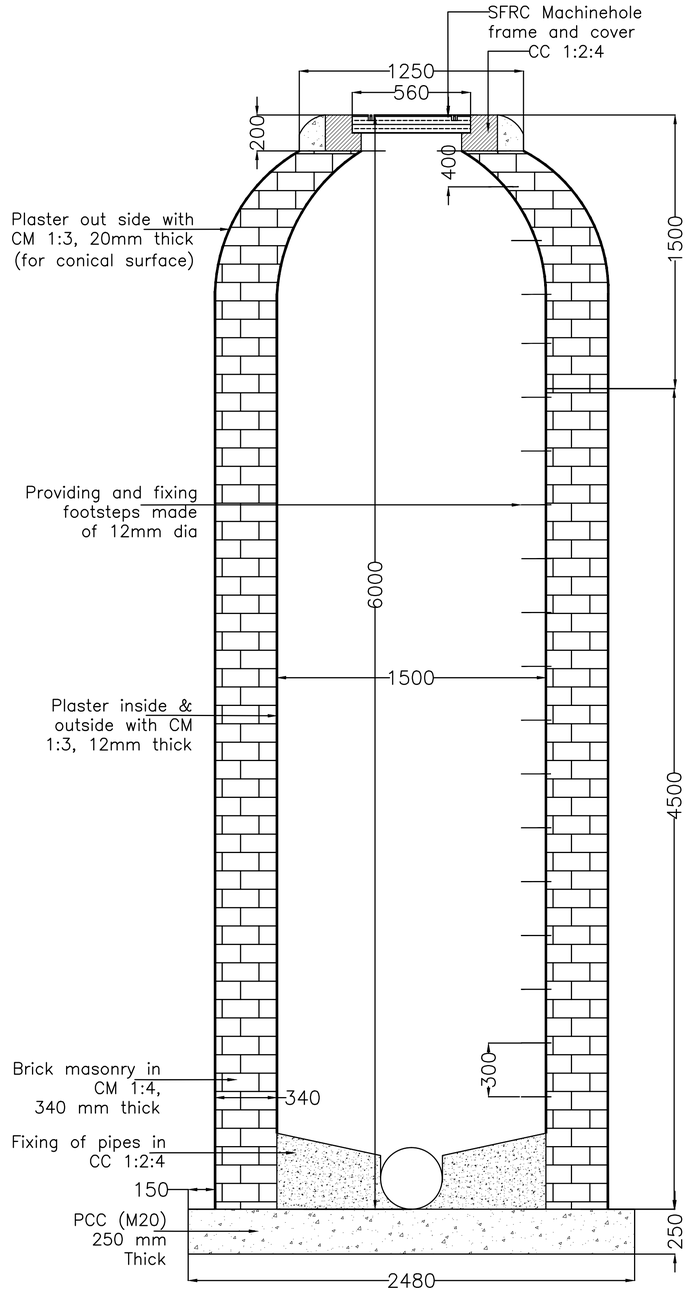
PLAN



SECTION A–A'



PLAN



SECTION B–B'

NOTES:

1. **All levels are in MM, Unless Other Wise Mentioned.**
2. **All Levels Are With Reference To The Gts Bench Mark Engraved On Centre Of 2nd Stones** On East Side Of Queen Victoria's Statue In Cubbon Park, Bangalore. Its Value Is 912.266m.
3. All the Co–ordinates are based on UTM WGS–84.

DRAWING / DOCUMENT REVIEW STATUS

Date of Receipt .....

A. Approved, manufacture / construction may commence.
B. Acceptable subject to changes indicated, resubmit for approval but manufacture/ construction may commence.
C. Amend as per the comments indicated and resubmit for approval.
D. Comments noted in letter/memo attached to forwarding transmittal Nr..... dated ..... Amend as comments indicated resubmit for approval.
E. Amend as comments indicated resubmit for record.
F. Comments noted in letter/memo attached to forwarding transmittal Nr. ..... dated..... Amend as comments indicated resubmit for record.
G. Drawing of this category is for information and hence not required to be approved.
H. Returned without review.

Approval of drawings / documents does not absolve Contractor / Vendor from any responsibilities for their accuracy or for the design, performance and safety of the Plant / Works or any other obligations under the contract and Indian Statutory Laws nor does it limit the Employer?s right under the contract.

LEGEND:

CM	CEMENT MOTAR
SFRC	STEEL FIBER REINFORCED CONCRETE
CC	CEMENT CONCRETE
PCC	PLAIN CEMENT CONCRETE

ISSUE	DATE	DESCRIPTION	BY	CHECKED	APPD.
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FOR TENDER PURPOSE ONLY

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY, SOLAR PANELS ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS [WORKS - A] AND PROCUREMENT AND CONSTRUCTION OF RISING MAIN, MAIN SEWERS AND LATERALS INCLUDING MACHINE HOLES AND LIFT SEWAGE PUMPING STATIONS [WORKS - B] HYBRID MODE FOR MAHADEVAPURA ZONES IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-5)

TITLE: PLAN & SECTION OF BRICK MASONRY MACHINE HOLE FOR 1.5 m DIA, 2m & 6m DEPTH

PROJECT MANAGEMENT CONSULTANTS:
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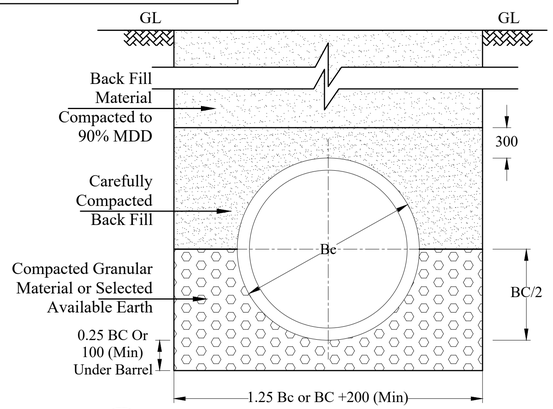
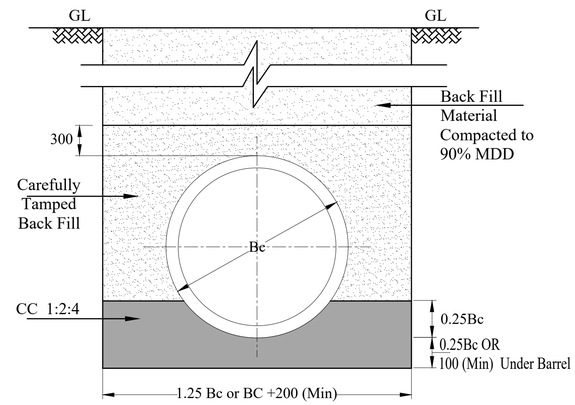
FILE NAME: TN–KWSDRP–WBS5–CV–3038.dwg		A1 SIZE

TITLE: TYPICAL DRAWING OF PIPE BEDDING/ENCASING

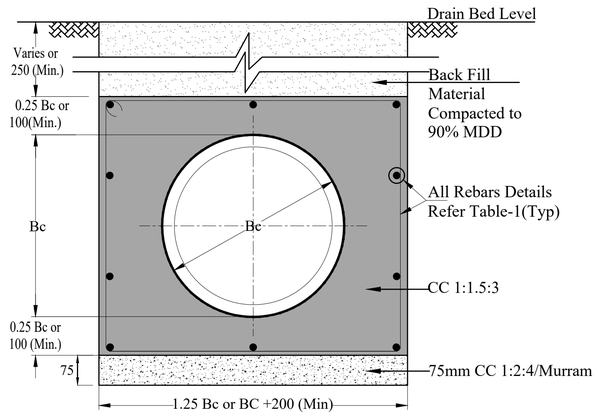
DWG NO: TN-KWSDRP-WBS4-CV-3039



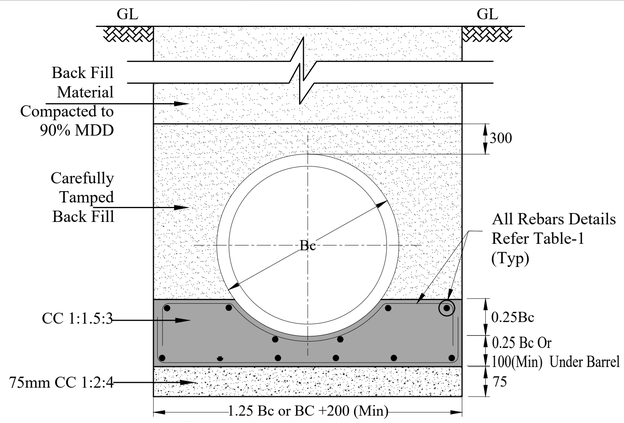
1 COMPACTED GRANULAR BEDDING(GRB) CLASS-B



2 PLAIN CONCRETE CRADLE BEDDING/BEDDING UNDER LINED DRAIN CLASS-Ab



3 BEDDING / ENCASING/UNDER UNLINED DRAIN CLASS-Ae



4 RCC CRADLE BEDDING CLASS-Ac

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. CONCRETE GRADE SHALL BE AS PER BOQ PROVISIONS.
3. STEEL FOR REINFORCEMENT SHALL BE HIGH YIELD STRENGTH DEFORMED BARS OF GRADE FE500 CONFORMING TO IS-1786.
4. REINFORCEMENT WHERE SPLICED SHALL HAVE A MINIMUM LAP OF 50 X BAR DIAMETER. LAPS SHALL BE STAGGERED.
5. CLEAR COVER TO REINFORCEMENT BEDDING SHALL BE 50MM.
6. THE FIGURE SHOWS TYPICAL ARRANGEMENT OF REINFORCEMENT FOR EXACT DETAILS REFER TABLE 1.
7. THE WORK SHALL BE DONE AS PER BOQ, SPECIFICATIONS AND CONTRACT PROVISIONS.
8. IN MAJOR ROADS AND ROAD CROSSINGS,TRENCH FILLING WITH QUARRY DUST CAN BE ADOPTED AND SHALL BE AS PER SITE REQUIREMENT OR AS DIRECTED BY ENGINEER.
9. THE THICKNESS OF QUARRY DUST SHALL NOT EXCEED 1m BELOW THE ROAD SURFACE.

ABBREVIATIONS

1. GL - GROUND LEVEL
2. Thk - THICK
3. Min - MINIMUM
4. Typ - TYPICAL
5. Bc - BARREL OUTER DIAMETER
6. C/C - CENTER TO CENTER
7. RCC - REINFORCED CEMENT CONCRETE
8. PCC - PLAIN CEMENT CONCRETE
9. MDD - MAXIMUM DRY DENSITY
10. WMM - WET MIX MACADAM
11. SWD - STORM WATER DRAIN
12. FRL - FINISHED ROAD LEVEL
13. GSB - GRANULAR SUB BASE
14. GRB -GRANULAR BEDDING

TABLE -1: REINFORCEMENT DETAILS FOR BEDDING/ENCASING

Barrel Internal Dia	Barrel Outer Dia (Bc)	CLASS - Ac			CLASS - Ae			
		Dia of rods	Top bars (Both Ways)	Bottom bars (BothWays)	Dia of rods	Top bars (Both Ways)	Bottom bars (BothWays)	Side Bars
			Spacing	Spacing		Spacing	Spacing	Spacing
300	380	10	200	150	10	250	250	250
350	500	10	200	150	10	250	250	250
400	550	10	200	150	10	250	250	250
450	600	10	200	150	10	250	250	250
500	650	10	200	150	10	250	250	250
600	770	10	200	150	10	250	250	250
700	870	10	200	150	10	250	250	250
800	990	10	200	150	10	250	250	250
900	1100	10	150	150	10	250	250	250
1000	1230	10	150	150	10	250	250	250
1100	1330	10	150	150	12	250	250	250
1200	1440	10	150	150	12	250	250	250
1400	1670	10	150	150	12	250	250	250

SL.NO.	TYPE OF BEDDING/ENCASING	APPLICATION CONDITIONS
1.	CLASS B	In firm, hard or dense soil/rocky strata for depths up to 6m cover.
2.	CLASS Ab	To be provided in loose soil, with depth of cover between 1m and 6m.(not to be adopted on hard or dense soil)
3.	CLASS Ae	1.For drain and road crossings 2.For sewer pipes laid in drains/nallah where cover over pipe is less than 1m
4.	CLASS Ac	1.For sewer pipes laid where cover over pipe is more than 6m/As per site conditions. 2.For sewer pipes laid along or across lake beds.

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TITLE: TYPICAL DRAWING OF PIPE BEDDING/ENCASING

PROJECT MANAGEMENT CONSULTANTS:
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NJS ENGINEERS INDIA PVT. LTD(JV)

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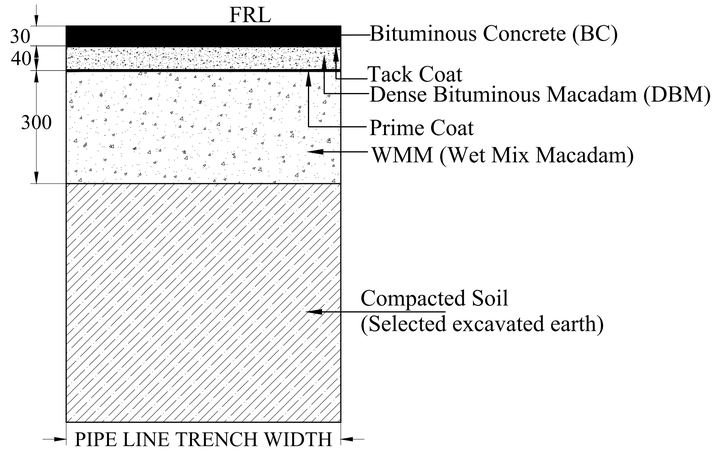
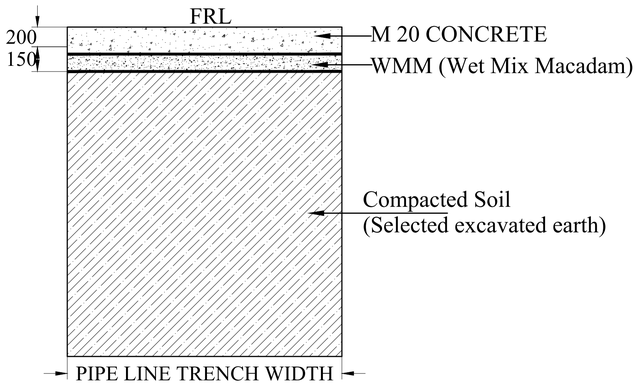
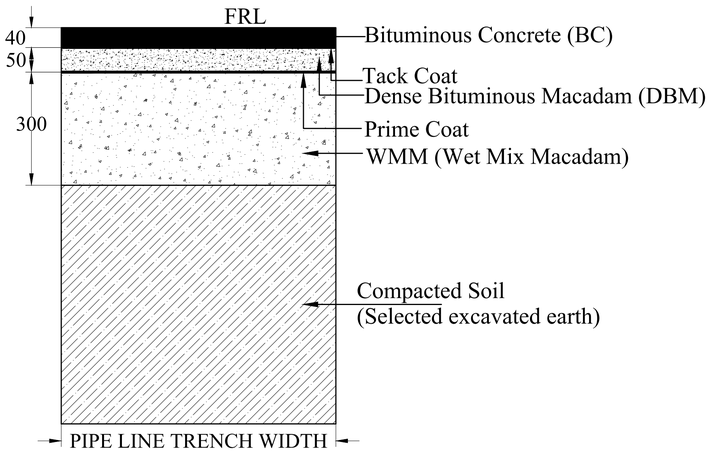
FILE NAME: TN-KWSDRP-WBS5-CV-3039.dwg		A1 SIZE



TYPICAL CROSS SECTION OF ASPHALT ROAD RESTORATION
(FOR ROAD WIDTH LESS THAN 40FT.)



TYPICAL CROSS SECTION OF
CONCRETE ROAD



TYPICAL CROSS SECTION OF ASPHALT ROAD RESTORATION
(FOR ROAD WIDTH MORE THAN 40FT.)

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. CONCRETE GRADE SHALL BE AS PER BOQ PROVISIONS.
3. THE WORK SHALL BE DONE AS PER BOQ, SPECIFICATIONS AND CONTRACT PROVISIONS.

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TITLE: TYPICAL CROSS SECTIONS FOR RESTORATION OF ASPHALT & CONCRETE ROADS

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

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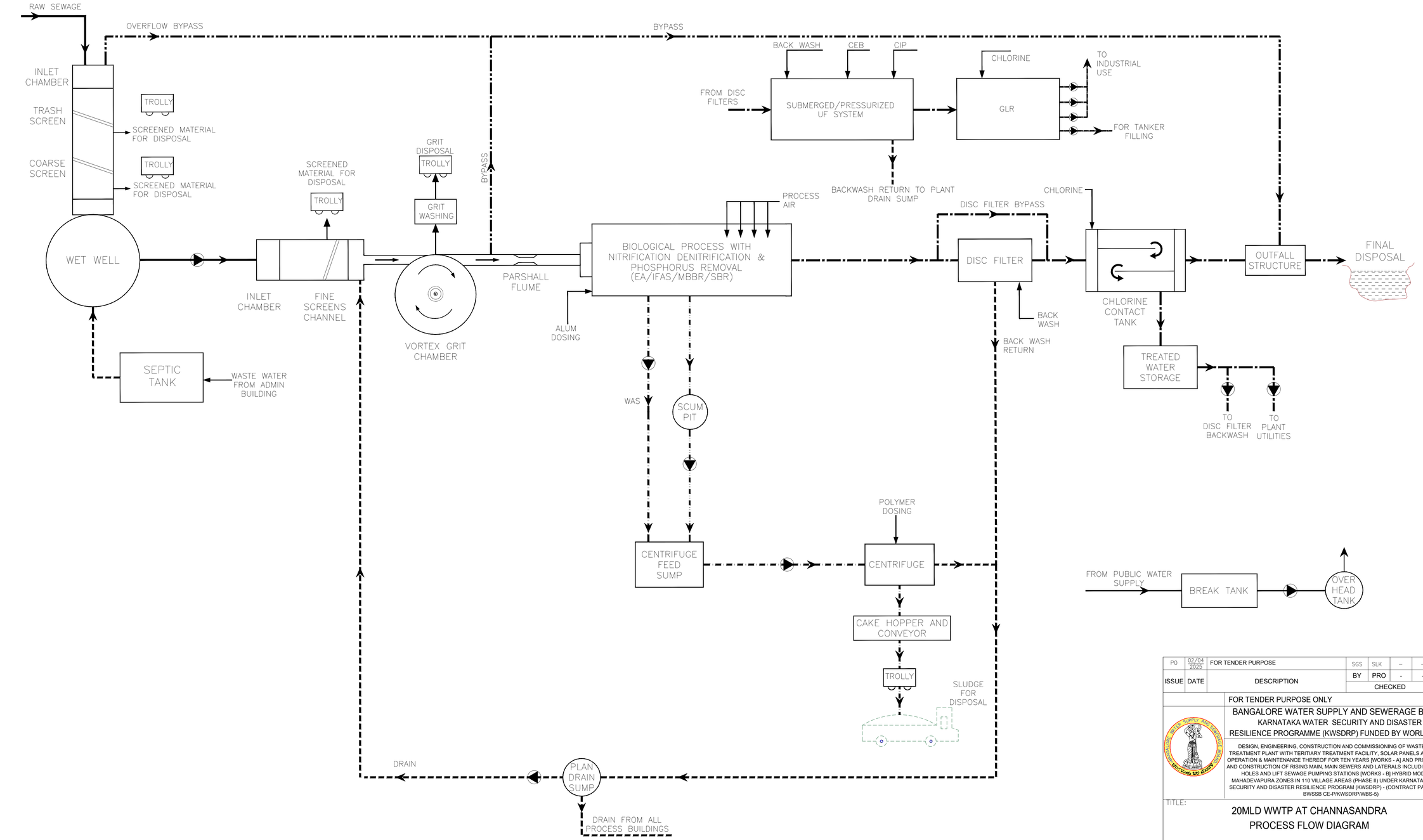
FILE NAME: TN-KWSDRP-WBS1-CV-3040		A1 SIZE



P0	02/04/2025	FOR TENDER PURPOSE	SGS	SLK	–	–	
ISSUE	DATE	DESCRIPTION	BY	PRO	-	-	APPD.
			CHECKED				

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TITLE:
20MLD WWTP AT CHANNASANDRA
PROCESS FLOW DIAGRAM

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD.,
NJS ENGINEERS INDIA PVT. LTD.,

DESIGNED: SLK	APPROVED	DATE: (TO ISSUE) 02/04/2025
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SCALE: NTS	DWG. NO. TN-KWSDRP-WBS5-CV-3058	ISSUE: P0
FILE NAME: TN-KWSDRP-WBS5-CV-3058.dwg		A1 SIZE

TITLE: 20MLD WWTP AT CHANNASANDRA PROCESS FLOW DIAGRAM
DWG NO: TN-KWSDRP-WBS5-CV-3058

TITLE: ELECTRICAL SINGLE LINE DIAGRAM FOR ELECTRICAL WORKS AT WASTEWATER TREATMENT PLANT (WWTP) WITH SOLAR PV POWER GENERATION & WITH REUSE

DWG NO: TN-KWSDRP-WBS5-EL-4001

INCOMERS FROM THE FROM NEAREST KPTCL/BESCOM SUBSTATION

11kV Al. CONDUCTOR, XLPE, ARM. UNDER GROUND CABLE

3 WAY RMU (DAS)
11kV, 630A, 350 MVA
(2 OD + 1VL)
(AS PER BESCOM SPECS.)

11kV, 630A ISOLATOR+ES

11kV, 630A ISOLATOR+ES

11kV, 630A VCB

11kV, AL ARMOURED XLPE CABLE

METERING CUBICLE
11KV, 3 CT & 3 PT
(AS PER BESCOM SPECS.)

TTB TVM

BESCOM'S SCOPE

PROPOSED WORKS UNDER CONTRACTOR'S SCOPE

11KV OUTDOOR VCB PANEL

11kV VCB

11kV, AL ARMOURED XLPE UNEARTHED CABLE

STEP-UP TRANSFORMER 0.415/11kV

KWH METER (SOLAR METER)

AC

11kV METAL ENCLOSED SWITCHBOARD
LOC: 11kV HT ROOM

27 59 TO OUTGOING

VSS+DV

MCB

R Y B

BUS PT
11kV/110V/110V
√3 / √3 / √3
CL.–0.5 (METERING)
CL.–3P (PROTECTION)

Line PT
11kV/110V/110V
√3 / √3 / √3
CL.–0.5 (METERING)
CL.–3P (PROTECTION)

METERING CT CL:0.5

PROTECTION CT CL:5P20

MFM RS-485

NUM RELAY 51,51N,50BF 27,59 RS-485

11kV VCB INCOMER

86 95 94

SA

11kV, 3PH, _____A, 50HZ, TP, CU BUSBAR, ___kA FOR 1SEC

11kV VCB

FROM BUS PT

NUM RELAY 51,51N,50BF

NUM RELAY 51,51N,50BF 51NS,50,50N

WTI OTI BR PR

SPARE

11kV, AL ARMOURED XLPE UNEARTHED CABLE

TR–1, 11kV/433V, ONAN, Z=% _____ KVA, AS PER IS:1180, DYN11, OUTDOOR PLINTH MOUNTED WITH WTI, OTI, BR, MOG, OSR PRV WITH TAP CHANGER INDICATION WITH +5% TO –15% TAPS IN STEPS OF 2.5%

TR–2, 11kV/433V, ONAN, Z=% _____ KVA, AS PER IS:1180, DYN11, OUTDOOR PLINTH MOUNTED WITH WTI, OTI, BR, MOG, OSR PRV WITH TAP CHANGER INDICATION WITH +5% TO –15% TAPS IN STEPS OF 2.5%

R 51NS

NON – SEGREGATED TPN ALUMINIUM BUSDUCT, 415V, ___A, TPN/4P ___KA/1 SEC

DG ROOM
415V DG SET WITH AMF CONTROL PANEL WITH ACB

G

1.1kV XLPE AL ARMOURED CABLE

415V PCC
LOC: SUB–STATION BUILDING

ON MCCB: ON OFF TRIP

ON ACB: BON BOFF ON OFF TCH SC T RC

MCB R Y B

METERING CT CL.–0.5

MFM

TO PLC (RS485)

EDO,ACB,TPN WITH MICROPROCESSOR RELEASE FOR O/C, E/F, UV & S/C

INCOMER–1 NC

INCOMER–2 NC

DG INCOMER NO

BUS–1

BUS–2

I/L

415V, 3PH, 50HZ, TPN, CU BUSBAR ___KA FOR 1SEC

BUSCOUPLER SAME AS INCOMER

FUSE

415/230V AC

TR

MCB DP

TPN MCCB

TPN ACB

KVAr APFCR

1.1kV XLPE CU/AL ARMOURED CABLE

FOR FEEDERS CONTROL SUPPLY

REUSE MCC PANEL

RTCC PANEL

BATTERY CHARGER

AIR BLOWER MCC

MLDB

EFDB SS BLDG

EFDB DG BLDG.

SPARE

CAPACITOR BANK WITH APFC

CAPACITOR BANK WITH APFC

CHLORINE MCC

RAS MCC

TSPS MCC

CENTRIFUGE MCC

RTCC PANEL

HEADWORKS MCC

SPARE

FOR FEEDERS CONTROL SUPPLY

SPARE 2 Nos

SPARE 2 Nos

BUILDING 01

ROOF TOP SOLAR PV PANELS

ROOF TOP SOLAR PV PANELS

JUNCTION BOX # 01

JUNCTION BOX # NN

DC

COMBINED DCDB

INVERTER

AC

BUILDING 02

BUILDING NN

COMBINED ACDB

LEGENDS:–

R RELAYING

I METERING

50 INSTANTANEOUS PHASE OVER CURRENT RELAY SUFFIX N– GROUND
51 INVERSE DEFINITE MINIMUM TIME OVER CURRENT RELAY SUFFIX N– GROUND, SUFFIX NS–STANDBY EARTH
95 TRIP CIRCUIT SUPERVISION RELAY
94 ANTI–PUMPING RELAY
27 UNDER VOLTAGE RELAY
86 LOCKOUT RELAY (HAND RESET)
PRV PRESSURE RELEASE VALVE
50BF BREAKER FAIL

3–PH DISTRIBUTION TRANSFORMER
CURRENT TRANSFORMER
POTENTIAL TRANSFORMER
CABLE TERMINATION
415V DRAW OUT TYPE AIR CIRCUIT BREAKER
11KV DRAW OUT TYPE VACUUM CIRCUIT BREAKER
415V MOULDED CASE CIRCUIT BREAKER
415V MINIATURE CIRCUIT BREAKER
BCS BREAKER CONTROL SWITCH
INDICATING LAMP

M MOTOR
STAR–DELTA STARTERS WITH SINGLE PHASE PREVENTOR AND MPR
DIRECT ONLINE STARTERS WITH SINGLE PHASE PREVENTOR AND MPR
G DG SET WITH AMF CONTROL PANEL
TCH TRIP CIRCUIT HEALTHY INDICATION (WHITE LED)
SC SPRING CHARGED INDICATION (BLUE LED)
BON BREAKER ON INDICATION (RED LED)
BOFF BREAKER OFF INDICATION (GREEN LED)
T TRIPPED ON FAULT INDICATION (AMBER LED)
DCF DC SUPPLY FAIL INDICATION (AMBER LED)
BS BREAKER IN SERVICE POSITION (RED LED)
BT BREAKER IN TEST POSITION (CLEAR LED)
ASF AC SUPPLY FAIL INDICATION (AMBER LED)
ON ON INDICATION (RED LED)

OFF OFF INDICATION (GREEN LED)
T TRIP INDICATION (AMBER LED)
R R–PHASE INDICATION LAMP (RED LED)
Y Y–PHASE INDICATION LAMP (YELLOW LED)
B B–PHASE INDICATION LAMP (BLUE LED)
L/O/R LOCAL/OFF/REMOTE SELECTOR SWITCH
SA SURGE ARRESTER
ASS+DA DIGITAL AMMETER WITH BUILT IN SELECTOR SWITCH
VSS+DV DIGITAL VOLTMETER WITH BUILT IN SELECTOR SWITCH
415V, FIXED TYPE MOTOR PROTECTION CIRCUIT BREAKER (MPCB)
ICP INSTRUMENTATION CONTROL PANEL
N.RELAY NUMERICAL RELAY
MFM MULTI FUNCTION METER WITH RS485 COMMUNICATION (AMMETER, VOLTMETER, PF, FREQUENCY)
PLC PROGRAMMABLE LOGIC CONTROLLER

MPR COMPREHENSIVE MOTOR PROTECTION RELAY
M METERING UNIT
CAPACITOR BANK
LCSP LOCAL CONTROL STARTER PANEL
TTB(CT SHORT LINK)
SS SOFT STARTER
SD LOCAL ISOLATOR SWITCH
RC READY TO CLOSE (CLEAR LED)
LCP LOCAL CONTROL PANEL
CONTROL TRANSFORMER
TR
I/L INTER LOCK

INTERLOCK:

INCOMER-1	INCOMER-2	BUS COUPLER	DG
ON	ON	OFF	OFF
ON	OFF	ON	OFF
OFF	OFF	ON	ON
OFF	ON	ON	OFF

NOTES:

1. TRIP COIL CIRCUITS OF ALL CIRCUIT BREAKERS SHALL BE PROVIDED WITH TRIP SUPERVISION RELAY TO SUPERVISE THE CIRCUIT IN BOTH OPEN AND CLOSED POSITION OF CIRCUIT BREAKERS.
2. ALL RELAYS USED IN 11kV SWITCHGEAR SHALL BE NUMERICAL TYPE.
3. AMMETERS IN MOTOR FEEDERS SHALL BE PROVIDED WITH SUPPRESSED SCALE UP TO 6 TIMES FULL LOAD CURRENT FOR INDICATION STARTING CURRENT.
4. ACB's SHALL BE PROVIDED WITH MICROPROCESSOR RELEASES FOR ADJUSTABLE OVERLOAD SHORT CIRCUIT, UNDER VOLTAGE AND EARTH FAULT FOR LT BREAKER. VCB'S SHALL BE PROVIDED WITH SHUNT TRIP COILS RATED WITH 110V DC FOR HT BREAKER.
5. MCCB's SHALL BE PROVIDED WITH ELECTRONIC RELEASES FOR ADJUSTABLE OVERLOAD, SHORT CIRCUIT AND EARTH FAULT.
6. ALL PANEL WIRING SHALL BE WITH 1100 VOLTS GRADE PVC INSULATED 1.5 Sqmm STRANDED COPPER WIRE FOR CONTROL WIRING & 2.5 Sqmm FOR CT SECONDARY WIRING.
7. ALL CT'S SHALL BE OF 5A SECONDARY AND 1A SECONDARY FOR 11KV FEEDERS.
8. ALL CONTACTOR/TIMERS etc., SHALL BE RAIL MOUNTED.
9. MINIMUM CONTACTOR RATING SHALL BE 16A.
10. CONTROL SUPPLY SHALL BE 240V AC TAPPED BETWEEN PHASE AND NEUTRAL FEEDERS MODULES.
11. MPCB SHALL BE WITH IN BUILT SINGLE PHASING PREVENTER.
12. ALL CONTACTORS SHALL BE OF AC 3 DUTY.
13. WIDTH OF FEEDER COLOUMN SHALL BE MINI 500 mm CABLE ALLEY SHALL BE 300mm MINI.
14. ALL ACB, MCCB, CONTACTORS, MPCB, & MPR SHALL BE OF TYPE–2 CO–ORDINATION.
15. LCP SHALL BE AS INDICATED IN P&ID.
16. CT RATIO SHALL BE 10% MORE THAN THE FLC 0.85PF & 0.9 EFFICIENCY.
17. CABLE COMPARTMENT SHALL HAVE LED LAMP INTERLOCKED WITH DOOR.
18. ALL INDICATION LAMP SHALL HAVE LED CLUSTER TYPE.
19. ALL MCCB SHALL HAVE EXTENDED ROTORY HANDLE & EXTENDED BUSBAR LINK
20. OPERATION LOGIC OF 415V SWITCHBOARD:
(A) AT NORMAL CONDITION BOTH THE TRANSFORMER INCOMER FEEDER SHALL BE IN CLOSED POSITION. THE BUS COUPLER AND DG INCOMER IN OPEN POSITION.
(B) IN CASE OF FAULTS, THE FAULTY INCOMER FEEDER SHALL BE OPEN POSITON THE BUS COUPLER AND THE HEALTHY INCOMER FEEDER SHALL BE CLOSED POSITON.
(C) IN CASE OF POWER FAILURE, THE DG INCOMER, BUS COUPLER SHALL BE IN CLOSED POSITION. BOTH THE TRANSFORMER INCOMER SHALL BE SWITCHED OFF BY ACTIVATION OF UNDER VOLTAGE RELAY OF THE GRID INCOMER.
21. MOTOR FEEDER <5.5kW WILL HAVE DIRECT CONNECTED AMMETER IN Y PHASE, MOTORS >5.5kW UPTO 15kW WILL BE PROVIDED WITH 1 CT AND AMMETER AND MOTOR >15kW AND ABOVE WILL BE PROVIDED WITH 3 CTS AND AMMETER.
22. NECESSARY INTERLOCK TO SPACE HEATER WITH MOTORS TO BE PROVIDED.
23. ALL MCB SHALL HAVE KW = 100% Ics.
24. ALL MCCB CONNECTED TO MOTOR SHALL BE RATED TO MOTOR DUTY.
25. ALL ACB SHALL HAVE Icu = Ics = Icw.
26. THE 415V SIDE OF THE TRANSFORMER IS PROVIDED WITH NON SEGREGATED ALUMINUM BUS DUCT IF THE TRANSFORMER RATING IS GREATER THAN OR EQUAL TO 1000KVA. FOR THE TRANSFORMER RATING IS LESS THAN 1000KVA XLPE AL ARMOUED CABLE SHALL BE PROVIDED ON 415V SIDE.
27. CABLE SIZES LESS THAN OR EQUAL TO 6 Sqmm SHALL BE PROVIDED WITH COPPER CONDUCTORS AND AL CONDUCTORS TO BE USED FOR CABLE SIZES ABOVE 6 Sqmm.
28. CAPACITOR BANK WITH APFC SHALL BE PROVIDED WITH INTERLOCK SUCH THAT PANELS ARE FED BY DG SET, CAPACITOR BANK SHALL BE DISCONNECTED.
29. 20% SPARE FEEDERS WITH MINI OF 1 SPARE FEEDER FOR EACH RATING OF THE OUTGOING FEEDERS SHALL BE PROVIDED IN LT PANELS (PCC/MCC).

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BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERRITARY TREATMENT FACILITY, SOLAR PANELS ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS [WORKS - A] AND PROCUREMENT AND CONSTRUCTION OF RISING MAIN, MAIN SEWERS AND LATERALS INCLUDING MACHINE HOLES AND LIFT SEWAGE PUMPING STATIONS (WORKS - B) HYBRID MODE FOR MAHADEVAPURA ZONES IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-5)

TITLE:
ELECTRICAL SINGLE LINE DIAGRAM FOR ELECTRICAL WORKS AT WASTEWATER TREATMENT PLANT (WWTP) WITH SOLAR PV POWER GENERATION & WITH REUSE

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD (JV)

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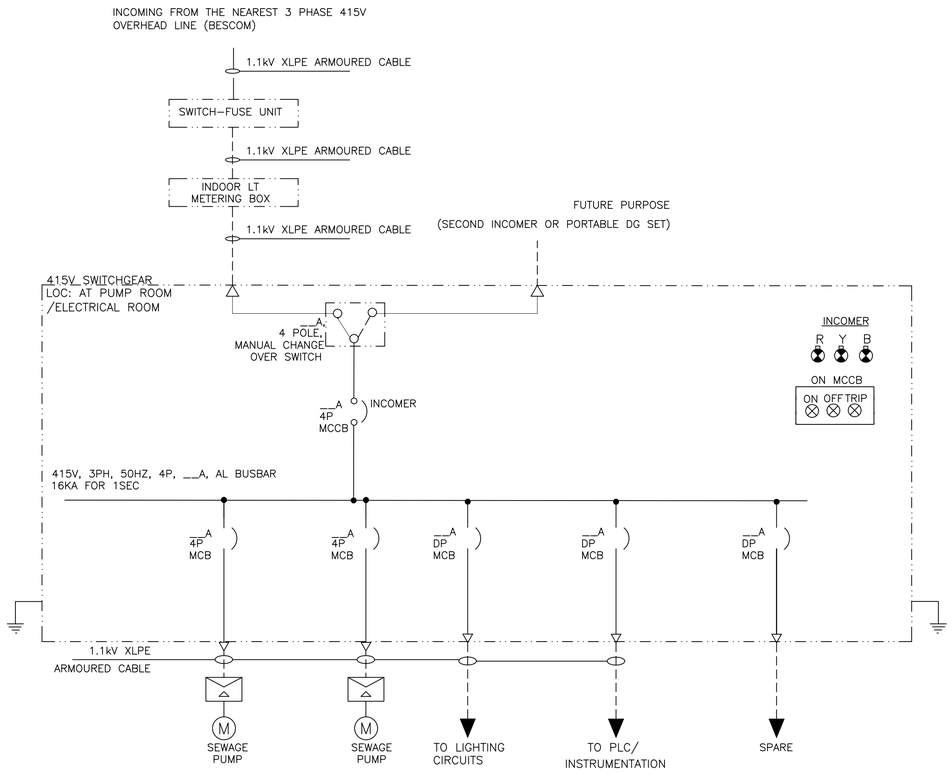
TITLE:	DWG NO:
ELECTRICAL SINGLE LINE DIAGRAM FOR THE ELECTRICAL WORKS AT LIFT PUMPING STATION (TYPICAL)	TN-KWSDRP-WBS5-EL-4003



LEGEND:-

- R — R-PHASE INDICATION LAMP (RED LED)
- Y — Y-PHASE INDICATION LAMP (YELLOW LED)
- B — B-PHASE INDICATION LAMP (BLUE LED)
- CHANGE OVER SWITCH
- 415V MOULDED CASE CIRCUIT BREAKER
- ON — ON INDICATION (RED LED)
- OFF — OFF INDICATION (GREEN LED)
- TRIP — TRIP INDICATION (AMBER LED)
- CABLE TERMINATION
- M — MOTOR
- 415V MINIATURE CIRCUIT BREAKER
- STAR DELTA STARTER

NOTES:-

1. MCCB's WILL BE PROVIDED WITH MICROPROCESSOR RELEASES (O/L, S/C, E/F) FOR ABOVE 250A AND THERMAL MAGNETIC TYPE (O/L, S/C, E/F) FOR BELOW 250A.
2. ALL PANEL WIRING WILL BE WITH 1100 VOLTS GRADE PVC INSULATED 1.5 Sqmm STRANDED COPPER WIRE FOR CONTROL WIRING & 2.5 Sqmm FOR CT SECONDARY WIRING.
3. ALL CONTACTOR/TIMERS etc., WILL BE RAIL MOUNTED.
4. MINIMUM CONTACTOR RATING WILL BE 16A.
5. ALL CONTACTORS WILL BE OF AC 3 DUTY.
6. ALL INDICATION LAMP WILL HAVE LED CLUSTER TYPE.
7. ALL MCB WILL HAVE KW= 100% Ics.
8. ALL MCCB CONNECTED TO MOTOR WILL BE RATED TO MOTOR DUTY.
9. CABLE SIZES LESS THAN OR EQUAL TO 6 Sqmm WILL BE PROVIDED WITH COPPER CONDUCTORS AND AL CONDUCTORS TO BE USED FOR CABLE SIZES ABOVE 6 Sqmm.
10. CAPACITOR WILL BE MIXED DIELECTRIC POLYPROPYLENE TYPE.
11. MOTOR RATING LESS THAN OR EQUAL TO 5.5kW – DOL STARTER AND MOTOR RATING ABOVE 5.5kW LESS THAN OR EQUAL TO 37kW – STAR DELTA STARTER.
12. FOR MOTOR RATING LESS THAN 15kW, MPCB WILL BE PROVIDED WITH BI-METAL OVERLOAD PROTECTION, SHORT CIRCUIT PROTECTION AND PROTECTION AGAINST SINGLE PHASING.
13. FOR MOTOR RATING MORE THAN 15kW UP TO 100kW MCCB WILL BE PROVIDED WITH ELECTRONIC MOTOR PROTECTION RELAY PROVIDING PROTECTION FROM OVERLOAD, EARTH FAULT, PHASE CURRENTS OUT OF BALANCE AND PROTECTION AGAINST SINGLE PHASING.
14. TYPE-2 COORDINATION CHART SHALL BE FOLLOWED FOR SELECTION OF COMPONENTS FOR MOTOR STARTERS.
15. DEDICATED TERMINAL BLOCK (TB'S) SHALL BE PROVIDED IN RESPECTIVE STARTER PANEL(FOR PLC INTERGATION).
16. THE CAPACITOR SHALL BE CONNECTED DIRECTLY ACROSS THE MOTOR TERMINALS.

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BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY, SOLAR PANELS ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS (WORKS - A) AND PROCUREMENT AND CONSTRUCTION OF RISING MAIN, MAIN SEWERS AND LATERALS INCLUDING MACHINE HOLES AND LIFT SEWAGE PUMPING STATIONS (WORKS - B) HYBRID MODE FOR MAHADEVAPURA ZONES IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-5)

TITLE: ELECTRICAL SINGLE LINE DIAGRAM FOR THE ELECTRICAL WORKS AT LIFT PUMPING STATION (TYPICAL)

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD (JV)

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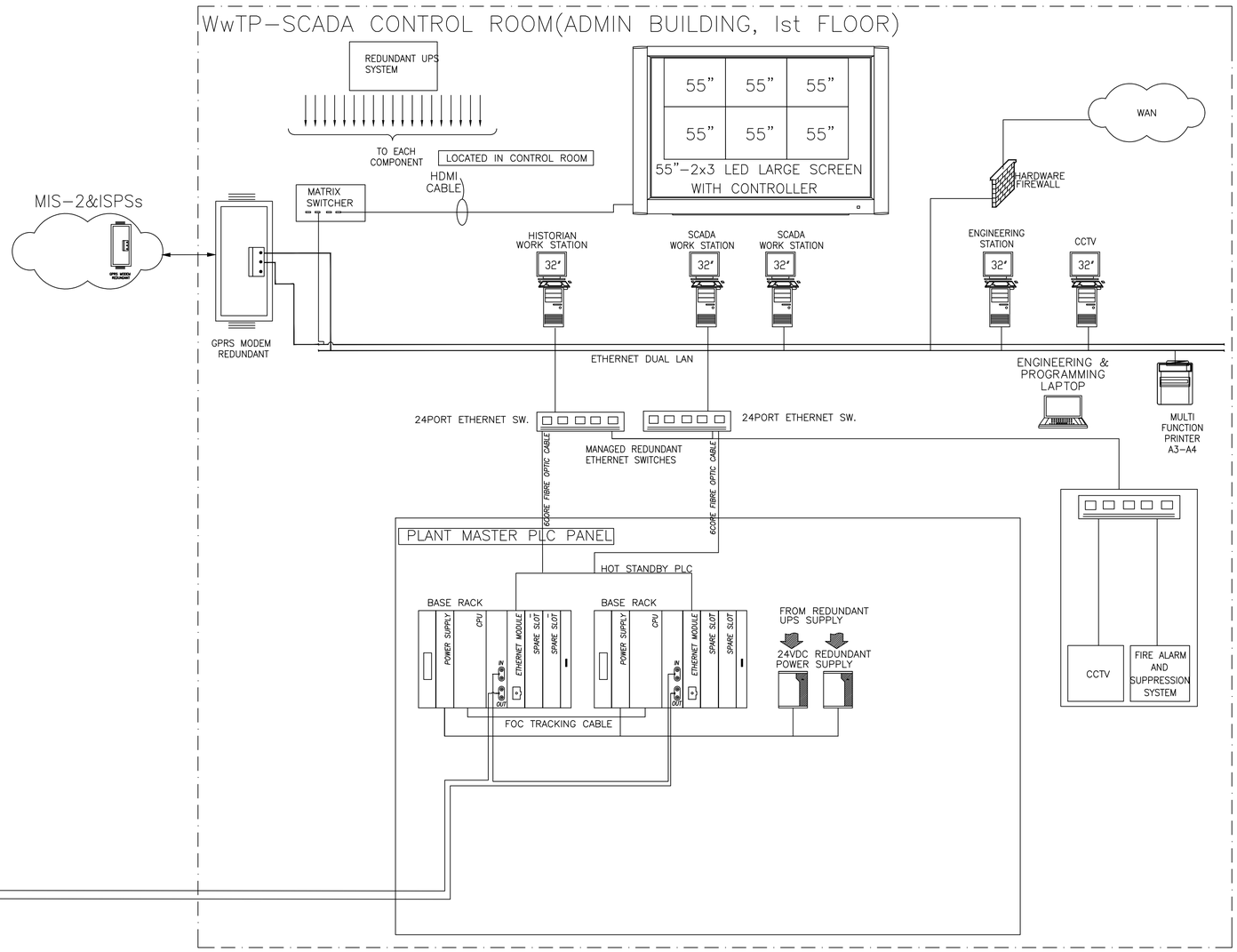
TITLE: SCADA CONTROL SYSTEM ARCHITECTURE DRAWING FOR WWTP AT CHANNASANDRA

DWG NO: TN-KWSDRP-WBS5-IC-5009



LEGEND:–

S.No.	SYMBOL	DESCRIPTION
1.	PLC	PROGRAMMABLE LOGIC CONTROLLER
2.	———	ETHERNET CABLE
3.	–·–·–·–	MODBUS RS485 CABLE
4.	═══	SINGLE MODE OPTICAL FIBER CABLE (OFC)–REDUNDANT MODE
5.	▬▬	SIGNAL CABLE
6.	———	HDMI CABLE
7.	SCADA	SUPERVISORY CONTROL AND DATA AQUISITION
8.	HMI	HUMAN MACHINE INTERFACE
9.	CCTV	CLOSED CIRCUIT TELEVISION
10.	CPU	CENTRAL PROCESSING UNIT
11.	UPS	UNINTERRUPTIBLE POWER SUPPLY
12.	WAN	WIDE AREA NETWORK
13.	LAN	LOCAL AREA NETWORK
14.	ODU	OUT DOOR DISPLAY UNIT
15.	OARM	ONLINE ANALYTICAL REAL TIME MULTIPARAMETERS
16.	KSPCB	KARNATAKA STATE POLLUTION CONTROL BOARD

NOTES:–

1. PLANT MASTER PLC SHALL BE HOT–STAND–BY CONFIGURATION[REDUNDANT CONTROLLERS, POWER SUPPLY & COMMUNICATION MODULES]
2. SCADA CONTROL ROOM SHALL BE LOCATED AT 1ST FLOOR OF ADMIN BUILDING.
3. REDUNDANT SCADA SERVERS SHALL BE CONFIGURED WITH HOTSTAND–BY CONTROLLERS
4. HISTORIAN SERVER (BLADE TYPE) SHALL BE CONFIGURED WITH SCADA SERVER AND THE SAME SHALL BE UTILIZED THROUGH HISTORIAN OPERATOR WORKSTATION FOR CONTINUOUS BACKUP & RETRIEVAL OF SCADA SERVER DATA
5. ALL RIO PANELS SHALL BE CONFIGURED THROUGH PLANT HOTSTAND–BY CONTROLLER THROUGH REDUNDANT OPTICAL FIBRE CABLE (OFC) UNDER RING NETWROK TOPOLOGY.
6. THE INPUT & OUTPUT (ANALOG / DIGITAL) MODULES SHALL BE AS REQUIRED SUBJECT TO APPROVED INPUT & OUTPUT(IO) SCHEDULE.
7. THE SPARE PHILOSOPHY FOR INPUT & OUTPUT (ANALOG/ DIGTAL) SHALL BE CONSIDERED AS 30% WHICH INCLUDES PANEL ACCESSERIES OF POTENTIAL FREE CONTACTS & TERMINAL BLOCKS– APPLICABLE FOR RIO PANELS AS WELL AS ANY SUB PROCESS SYSTEMS OF VENDOR PACKAGE PLC PANELS.
8. THE SPARE MEMORY FOR CONROLLERS SHALL BE 50% SPARE AS PROGRAM MEMORY AND DATA MEMORY
9. MULTI FUNCTION ENERGY METERS (MFMs) SHALL BE CONNECTED TO RESPECTIVE RIO PANEL THROUGH RS–485 CONNECTIVITY
10. FIRE ALARM SYSTEM & CLOSE CIRCUIT TELEVISION SYSTEMS SHALL BE INTERFACED WITH PLANT SCADA SYSTEMS.
11. 15" INCHES PANEL MOUNTED HMIs SHALL BE CONSIDERED FOR EACH RIO PANEL AND 10" INCHES PANEL MOUNTED HMIS SHALL BE CONSIDERED IN CASE OF ANY SUB PROCESS SYSTEMS OF VENDOR PACKAGE CONTROL SYSTEM
12. LARGE VIDEO SCREEN (55" led 2 X3 DISPLAY ARRAY) WITH REQUIRED CONTROLLER AND SOFTWARE FOR SCREEN SPLITTING BETWEEN VARIOUS LED ARRAY SCREENS WITH SCADA & CCTV SYSTEM FOR LIVE MONITORING OF SCADA & CCTV FEEDS. OPERATOR CAN ALSO BE ABLE TO CHANGE PLANT SCADA SCREENS IN LED ARRAYS AS PER HIS CONVINIENT WITH RESPECT TO BETTER OPERATIONAL POINT OF VIEW.
13. PLANT BULK DATA [COMPLETE PLANT OPERATIONAL DATA INCLUSIVE OF LAB DATA THROUGH LIMS] TO BE TRANSMITTED TO MIS–2 CENTRAL SCADA SYSTEM AT SHIMSHA BHAVAN THROUGH REDUNDANT GPRS COMMUNICATION MODULES THROUGH INTERFACE PANEL.
14. ONLINE ANALYTICAL REALTIME MULTIPARAMETER SHALL BE CONSIDERED FOR INLET & OUTLET OF WwTP AND THOSE READINGS TRANSMITTED TO KSPCB AS WELL AS PLANT SCADA SYSTEM.
15. THE VENDOR PLCs DATA SHALL BE INTERFACED WITH PLC / SCADA SYSTEM BY USING SERIAL COMMUNICATION FOR THE PURPOSE OF CONTINUOUS MONITORING & CONTROL.
16. The RIO Panel shall be applicable for any non–SBR Packages (i.e. Vendor Package PLC applicable for SBR Package)

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TITLE:

SCADA CONTROL SYSTEM ARCHITECTURE DRAWING FOR WwTP AT CHANNASANDRA

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD (JV)

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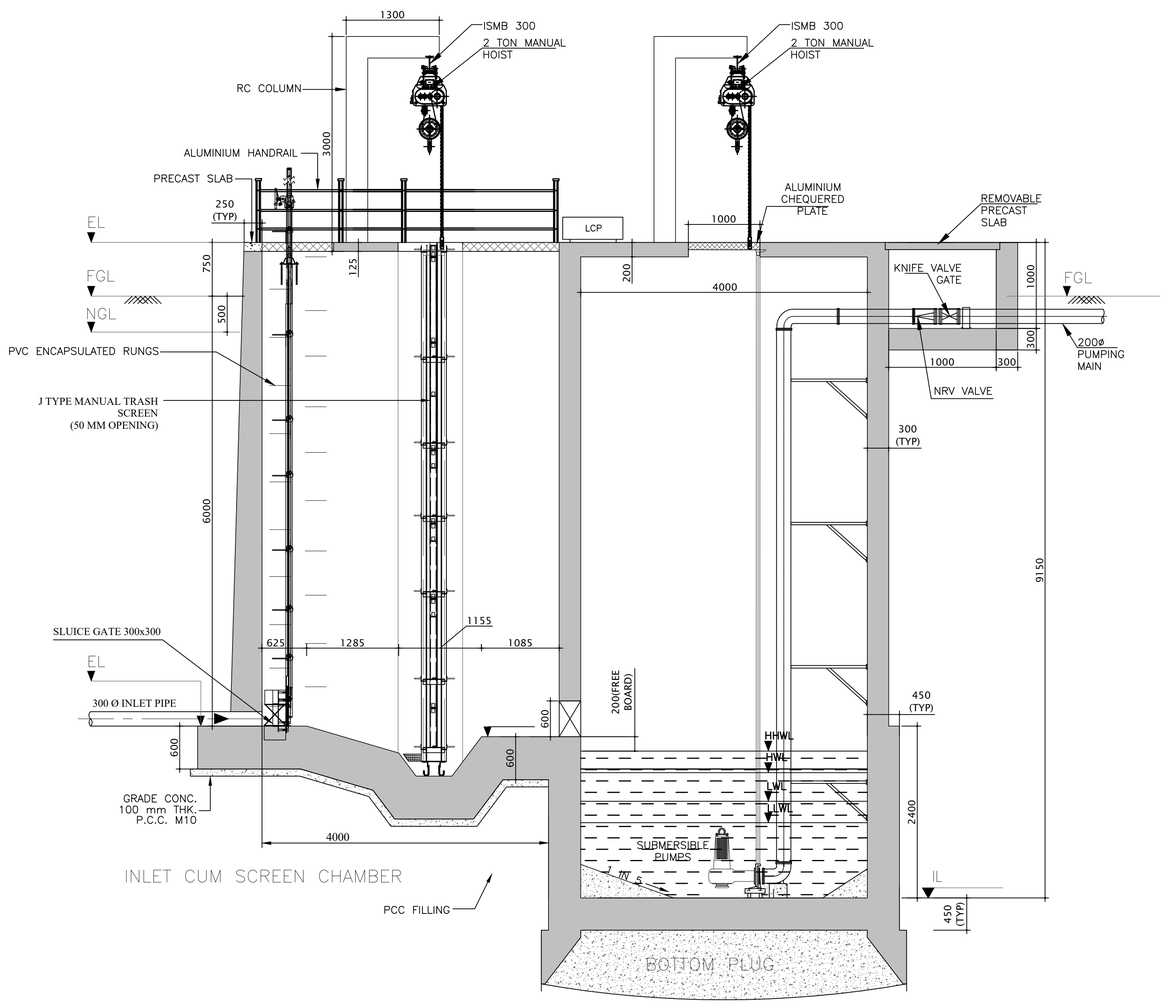
TITLE: TYPICAL MECHANICAL GA DRAWING FOR LIFT PUMPING STATION

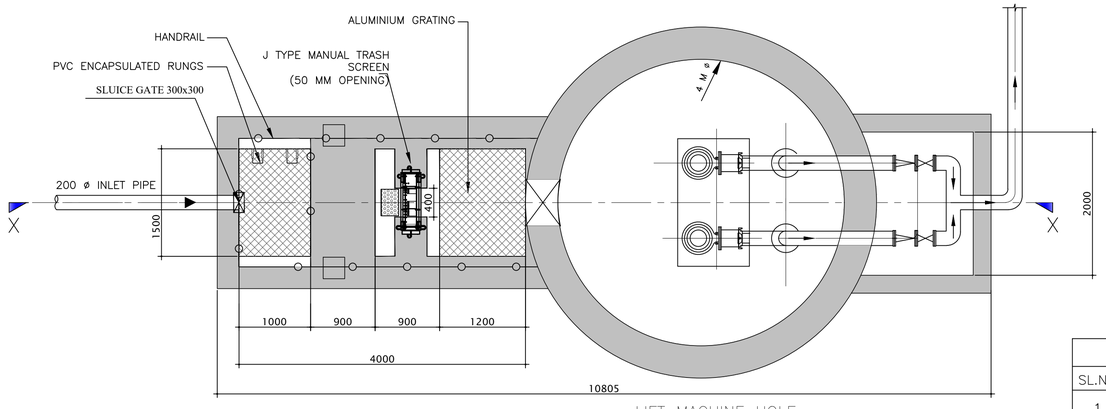
DWG NO: TN-KWSDRP-WBS5-ME-6000



INLET CUM SCREEN CHAMBER

LIFT MACHINE HOLE

SECTIONAL ELEVATION X–X



SECTIONAL PLAN

LIFT MACHINE HOLE

MECHANICAL EQUIPMENT LIST

SL.NO	EQUIPMENT NAME	CAPACITY	TYPE	QUANTITY	REMARKS
1	LPS pumps	AS PER BID SPECIFICATION AND BOQ	Non clog Submersible	2	
2	Manual monororail hoist (Trash Screens)			1	
3	Trash Screens		J Type Manual Trash Screens	1	

NOTE :

1. ALL DIMENSIONS ARE IN mm AND LEVELS ARE IN m.
2. AREA OF LAND ALLOCATED FOR LPS=12m L X 8m W.
3. SBC=200 kN/m^2 @ 6m BELOW NGL AND 250 kN/m^2 @ 9m BELOW NGL.
4. CEMENT USED SHALL BE SRPC.
5. CRS BARS CONFIRMING TO IS 1786 TO BE USED.
6. PROTECTIVE COATINGS 500MICRONS TO BE PROVIDED FOR INSIDE SURFACES.
7. SS304 HANDRAILS AND CHEQUERED PLATES SHALL BE IN ALUMINIUM

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TITLE: TYPICAL MECHANICAL GA DRAWING FOR LIFT PUMPING STATION

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

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